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Extension Bulletin 9

Cornell Extension Bulletin

Published by the New York State College of Agriculture
at Cornell University, Ithaca, New York

A. R. Mann, Acting Director of Extension Service

Gladiolus Studies—I

Botany, History, and Evolution of the Gladiolus

Alvin C. Beal



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PREFACE

The American Gladiolus Society was organized at Boston, Massachusetts, on the 27th of May, 1910, and the first meeting was held at Rochester, New York, in August of the same year. Among the objects of the society were the following: "to establish a standard nomenclature; to test out new varieties and give them the recognition they deserve; and to disseminate information relating to this flower."

Through a cooperative arrangement between the society and Professor L. B. Judson, representing the Department of Horticulture at Cornell University, the trial grounds of the society were located at Ithaca, New York. On the resignation of Professor Judson, who was in charge of the trials, the direction of the tests devolved on Professor John Craig, who placed George J. Burt in charge of the detail work. Mr. Burt made the notes in the field during 1911, and in the greenhouse in the winter of 1911-12. Since March, 1912, A. C. Hottes has had charge of the trials, at first under the direction of Professor Craig and later under the supervision of the writer. On October 1, 1913, the Department of Floriculture at Cornell University was organized, and the gladiolus trials were continued as a part of the investigative work of the department.

All the varieties included in these studies have been tested for more than one season, and thus a more satisfactory estimate of the merits of each variety has been obtained than would otherwise have been possible. If the work has seemed prolonged, it is due in part to the unusual and unavoidable changes in its supervision, but in larger measure to the difficulty encountered in procuring stock of varieties suspected of being synonymous with the varieties already known.

The thanks of the American Gladiolus Society and of the Department of Floriculture at Cornell are due to all who have assisted in the work either by the donation of corms or by furnishing information. Those connected with the trials are indebted also to the present and the former officers of the society for their cooperation and support.

The present bulletin is intended to trace the development of the gladiolus up to the present time. Succeeding bulletins will treat of its culture and of the varieties that have been tested in the Craig gardens of the New York State College of Agriculture at Cornell University

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Society.*

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GLADIOLUS GANDAVENSIS

ADAPTED FROM VAN HOUTTE'S FLORE DES SERRES ET
DES JARDINS DE L'EUROPE



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GLADIOLUS STUDIES — I

BOTANY, HISTORY, AND EVOLUTION OF THE GLADIOLUS

ALVIN C. BEAL

And the small wild pinks from tender
Feather-grasses peep at us
While above them burns on slender
Stems the red gladiolus.— Lord Lytton.

Among the summer garden flowers, few, if any, have made more rapid progress in popular favor in recent years than the gladiolus. The showy character of the tall spikes of flowers, their long period of bloom and comparative ease of culture, render them popular garden subjects. Popular as they now are, they deserve to be better known until they are found in every garden or dooryard where flowers are grown.

Although gladiolus blossoms have been sold on some markets for many years, it appears that only during the last fifteen years have the merits of this plant as a summer cut flower come to be known and appreciated by florists and the flower-buying public. At the present time, gladioli rank among the first of the summer cut flowers for market, their keeping qualities rendering them very satisfactory for table and other decorations.

The name *gladiolus* is variously pronounced and from time to time during the last fifty years its pronunciation has occasioned some controversy in the horticultural press. The word is a Latin diminutive of *gladius* (a sword) and means *little sword*. If the pronunciation follows the Latin rule, according to which derivative endings in *olus* have a short penultimate syllable, the *o* is short. Furthermore, according to the rule for Latin pronunciation, a vowel is regularly short before another vowel, which makes the *i* short. Latin dictionaries give the first vowel in *gladius* and *gladiolus* as short. The word should therefore be marked thus: glădīōlus.¹ The rule for accent is as follows: "Words of more than two syllables are accented upon the penult (next to the last) if that is a long syllable, otherwise upon the antepenult (second from the last)."² *Gladiolus*, having a short penult syllable, *o*, would have the accent on the *i*, or antepenult syllable, thus: glă-dī-ō-lus. The plural is properly *gladioli*, although the English sometimes write it *gladioluses*.

¹ Latin pronunciation

ă as in *Cuba*

ī as in *cigar*

ō as in *obey*

English pronunciation

ă as in *fat*

ī as in *pin*

ō as in *not*

² Bennett, C. E. A Latin grammar. Revised edition, page 5. 1908.

BOTANY OF THE GLADIOLUS

The gladioli are cormaceous plants belonging to the family Iridaceae, which embraces more than thirty genera of ornamental plants in American culture, including *Crocus*, *Ixia*, *Freesia*, and *Iris*. *Crocus* and *Iris* are distinguished at once from *Gladiolus*, *Ixia*, and *Freesia* by the fact that they normally have more than one flower to a spathe. *Ixia* has equilateral stamens and a regular perianth, while in *Freesia*, *Lapeyrouisia*, and



FIG. 3. GLADIOLUS SEGETUM

Watsonia the style branches are bifid and the stamens unilateral. Botanists have had some difficulty in determining whether various plants of this section of the iris family belong to the genus *Gladiolus*, *Lapeyrouisia*, *Babiana*, or *Antholyza*. *Babiana* is distinguished by its very hairy, plaited leaves, while *Antholyza* has the tube suddenly dilated at the middle instead of gradually widening as in the genus *Gladiolus*.

The corms of the different species of *Gladiolus* vary considerably in size, shape, and color. Usually the body of the corm is white, yellowish, or red, and it is covered with a brown skin. The height of the plants varies considerably, ranging from a few inches to four feet or more. The leaves, which contribute so much to the beauty of the plant, vary in length, breadth, and color,

and also in number, some of the species having only two leaves while others have from four to six. The leaves are graceful, often bending backward toward their points as if to give greater prominence to the stem which arises out of them as they recurve from either side. The flowers form a spike on the summit of the stem, in some species arranged on one side of the stem only, in others on opposite sides. In the more modern cultivated varieties the flowers open so widely as to form a spike of matchless beauty.

HISTORY OF THE GENUS

The botanists and herbalists of the sixteenth and early seventeenth centuries, dealing only with the plants of Europe, did not give much attention to gladioli. Therefore little is found concerning this plant in the writings of Cordus, Clusius, the Bauhins, Dodoens, Caesalpinus, and Lobelius, and it is not until after 1750 that one finds numerous additions to the number of gladioli. The history of the plant is as follows:

Gerarde (1597)³ mentions the following:

G. Narbonensis, French corn flag. Flowers purple and arranged on both sides of the stalk.

G. Italicus, Italian corn flag. Flowers purple, similar in form to the preceding but arranged on one side of the stalk. A variety of this has pale-colored flowers.

The other forms mentioned — *G. Lacustris*, water sword-flag (mentioned in second edition, page 105), and *G. palustris*, water gladiole — were plants belonging to different genera.

Gerarde says further:

These kinds of corne flags growe in meadowes, and in eareable grounds among corne in many places of Italy, as also in the parts of Fraunce bordering thereunto. Neither are the fields of Austria and Moravia without them, as Cordus writeth. We have great plentie of them in our London gardens, especially for the garnishing and decking them up, with their seemly flowers.⁴

The gladiolus flowered from May to the end of June.

Bradley (1728) describes six forms of gladioli:

G. Narbonensis, French corn flag. Flowers reddish purple and arranged on one side of the spike.



FIG 4. FLOWER OF GLADIOLUS SEGETUM

³ Dates in parenthesis refer to bibliography, page 163.

⁴ It may be noted that Gerarde, in giving the various names of this plant, says that "Valerius Cordus calleth corne flag *Victorialis femina*; others *Victorialis rotunda*: In the Germanic tooing, *Seigwurtz*."

G. flore rubente, Blush corn flag. Resembles the French corn-flag except that it has pale red flowers.

G. flore albo, white corn flag. Similar to the last except that the flowers are white.

G. purpureus minor, small purple corn flag. Has smaller leaves, stalk, and flowers than the French corn-flag, which it otherwise resembles. The flowers are arranged on one side of the spike.

G. italicus, Italian corn flag. Flowers a little darker than those of the French corn-flag, and arranged on both sides of the spike.

G. Byzantinus, corn flag of Constantinople. Flower deeper red in color and larger, and with larger roots and leaves, than the French corn flag, and arranged on one side of the spike. Blooms after the other species are past. Plant more tender than the preceding.

Breyne (1739 b) describes *Gladiolus tristem*, *G. angustem*, *G. plicatum*, and *G. puniceum* Lam. The last-named is considered a synonym of *G. villosus* Ker. *G. angustus* was described in *Hortus Cliffortianus* under the name *G. foliis linearibus*.

Linnaeus, in his *Hortus Cliffortianus* (1737), describes the following species and gives references to the names of these in the writings of other botanists:

1. *Gladiolus foliis ensiformibus*.

Gladiolus, floribus uno versu dispositis, major. Bauh. pin. 41.

Gladiolus sive Xyphion. Bauh. hist. 2. p. 701.

Victorialis rotunda. Besl. eyst. 66. f. 2.

Gladiolus, floribus uno versu dispositis, major & procerior, flore purpureo-rubente. Tournef. inst. 365, Boerh. lugdb. 2. p. 365.

Gladiolus. Riv. mon. 163.

Gladiolus, floribus uno versu dispositis, major & procerior, flore candicante. Tournef. inst. 365.

Gladiolus, floribus uno versu dispositis, minor & humilior. Tournef. inst. 365.

Gladiolus, floribus uno versu dispositis, minor. Tournef. inst. 366.

Gladiolus carnei coloris. Tournef. inst. 365. Boerh. lugdb. 2. p. 127.

Gladiolus utrinque floridus. Bauh. pin. 41. Boerh. lugdb. 2. p. 126.

Gladiolus utrinque floriferus. Dod. pempt. 209.

Gladiolus utrinque floridus, flore rubro. Tournef. inst. 366.

Gladiolus utrinque floridus, flore albo. Tournef. inst. 366. Boerh. lugdb. 2. p. 127. (Native of Italy and around Monspelium.)

2. *Gladiolus foliis linearibus*. Vid. Tab.

Gladiolus africanus, folio gramineo, floribus carneis, macula rhomboidea purpurea inscriptis, uno versu positus. Boerh. lugdb. 2. p. 127.

(Native of Africa.)

In *Species Plantarum*, Linnaeus (1753 b) describes the following species:

communis. 1. *Gladiolus foliis ensiformibus*, floribus distantibus.

Gladiolus foliis ensiformibus. *Hort. cliff.* 20. *Hort. ups.* 16.

Gladiolus caule simplicissimo, foliis ensiformibus. *Roy. lugdb.* 19.

Gladiolus floribus uno versu dispositis. *Bauh. pin.* 41.

Habitat in Europa australi.

imbricatus. 2. *Gladiolus foliis ensiformibus*, floribus imbricatis.

Habitat in Russia citeriore.

Flores parvi versus unum latus imbricati.

spicatus. [Not at present included in the genus *Gladiolus*. Is *Watsonia spicata*.]

angustus. 4. *Gladiolus foliis linearibus*, floribus distantibus, corollarum tubo limbis longiore.

Gladiolus caule simplicissimo, foliis linearibus, floribus alternis. *Roy. lugdb.* 19.

Gladiolus foliis linearibus. *Hort. cliff.* 20. *t. 6.

Habitat in Africa.

- ramosus*. [Not at present included in genus *Gladiolus*. Is *Melasphaerula graminea*.]
capitatus. [Not at present included in genus *Gladiolus*. Is *Aristea capitata*.]

The second edition (1762) includes in addition to the above:

- alatus*. 4. *Gladiolus foliis ensiformibus, petalis lateralibus latissimis*. *Amæn. acad.* 6 *afric* 2.*
Sisyrinchium viperarum. *Pluk. phyt.* 224. f. 8.
Habitat ad Cap. b. spei.
p'icatus. [Now included in genus *Babiana* as *B. stricta*.]
tristis. 6. *Gladiolus foliis lineari-cruciatis, corollis campanulatis*.
Gladiolus bifolius & biflorus, foliis quadrangulis. *Trew. ehret. t.* 39.
Habitat in Æthiopia.
alopecuroides. [Now known as *Watsonia plantaginea*.]

In the *Encyclopédie Botanique* (Lamarck, 1786) twenty-six species are described, but in addition to the species of Linnæus only the following are now recognized: *G. bimaculatus* [= *involutus*]; *G. puniceus* [= *villosus*(?)]; *G. luteus* Lam.; *G. montanus* Linn.; and *G. recurvus*. The other species are now included in *Babiana*, *Ixia*, *Lapeyrousia*, *Melasphaerula*, and *Watsonia*.

John Bellenden Gawler (who later changed his name to Ker, also given in the bibliography) was the most prominent investigator working on the order Iridaceae during the first thirty or forty years of the nineteenth century. He published (Gawler, 1805) a complete synopsis of all the twenty-six genera, with a list of the two hundred and twenty-five species then known. In this paper many genera now recognized were for the first time named and fully characterized. Among these are *Anomatheca*, *Aristea*, *Babiana*, *Geissorhiza*, *Hesperantha*, *Marica*, *Melasphaerula*, *Morphixia*, *Pardanthus*, *Sparaxis*, and *Tritonia*. The following list of species of *Gladiolus* is given:⁵

- Cunonia* (Antholyza) B. M. t. 343.
Watsonius, B. M. t. 450.
Quadrangularis, B. M. t. 567 [Baker places this in Antholyza].
Namaquensis, B. M. t. 592 [Baker gives this as a variety of *G. alatus*].
Alatus, B. M. t. 586.
Viridis, Hort. Kew. 3 p. 481 [Ker later places this in *Tritonia*].
Viperatus, B. M. t. 688 [Baker gives this as a synonym of *G. orchidiflorus* Andr.].
Permeabilis, De la Roche Diss. 27.
Versicolor, B. M. t. 556 [Baker places this under *G. grandis* Thunb.].
Tristis, B. M. t. 272.
Hyalinus, Jacq. Ic. var. 2. t. 242.
Tenellus, Jacq. Ic. var. 2. t. 248. coll. 4. t. 3. f. 1.
Setifolius, Thunb. Diss. de Glad. 18.
Gracilis, B. M. t. 562.
Carinatus, B. M. t. 578 [Baker places this under *G. recurvus* Linn.].
Hirsutus [B. M. plates cited are not figures of this species].
Flexuosus, Thunb. Diss. de Glad. t. 1. f. 1 [Baker places this species in the genus *Acidanthera*].

⁵ Citations to plates that were not later confirmed by Baker have been omitted, so that persons desiring to look up the species of *Gladiolus* known one hundred years ago may do so without error. The comments in brackets after some of the species, except in the first case, were added by the writer from an examination of later works on the subject.

Carneus, B. M. t. 591 [Baker regards this as a synonym of var. *ventricosus* Lam. of *G. cuspidatus* Jacq.].
 Cuspidatus, B. M. t. 582.
 Blandus, B. M. t. 625, 645, 648.
 Angustus, B. M. t. 602.
 Undulatus, B. M. t. 647.
 Floribundus, B. M. t. 610.
 Milleri, B. M. t. 632.
 Cardinalis, B. M. t. 135.
 Byzantinus, B. M. tab. nondum evulgata (347).
 Communis, B. M. t. 86.
 Segetum, B. M. t. 719.

For many years Ker added to the knowledge of Iridaceae through his contributions to *Curtis's Botanical Magazine*. Later he joined Sydenham Edwards in establishing the *Botanical Register*. He published separately at Brussels in 1827 a paper entitled *Genera Iridearum*, in which he gives a synoptic list of a little over three hundred species classified in thirty genera. Under *Gladiolus* he recognizes the following in addition to those named above: *speciosus* Thunb.; *merianellus* Thunb.; *villosus* Ker; *aphyllus* Ker; *brevifolius* Jacq.; *laevis* Thunb.; *Breytianus* Ker; *suaveolens* Ker; *elongatus* Thunb.; *trichonemifolius* Ker; *inflatus* Thunb.; *recurvus* Linn.; *trimaculatus* Lam.; *vomerulus* Ker; *involutus* De la Roche; *edulis* Ker; *imbracatus* Linn.; *luteus* Lam. Altogether he gives a synoptic list of forty-six species of *Gladiolus*, with a list of eight additional names of species doubtfully placed. With the publication of this paper the labors of this botanist on the order appear to have ceased.

After the death of Dean Herbert in 1847 there was no recognized authority on the Iridaceae for about thirty years. Dr. F. W. Klatt, of Hamburg, between 1863 and 1895 published several papers which collectively give a fairly good synopsis of the order.

In 1878 John Gilbert Baker published his *Systema Iridacearum* in the *Journal of the Linnean Society*, in which he classified about seven hundred species in sixty-five genera. His *Handbook of the Iridæ* appeared in 1892, and in this are fully described nine hundred and twenty-six species belonging to fifty-seven genera. The following generic description and list of subgenera of *Gladiolus* are taken from the latter work. No key is given to the one hundred and thirty-two species described, but the number of species included under each subgenus is given.

GLADIOLUS Linn.

Perianth-tube usually funnel-shaped; segments of the limb more or less unequal in shape and direction, oblong, spatulate or unguiculate, the upper of the outer row generally the largest. *Stamens* inserted at the throat of the perianth-tube, contiguous and arching; filaments short, free; anthers linear, basifixed. *Ovary* 3-celled; ovules many, superposed; style long, arcuate; stigmas cuncate, entire. *Capsule* oblong, loculicidally 3-celled. *Seeds* globose or discoid, sometimes distinctly winged.—*Rootstock* a tunicated corm. *Produced leaves* distichous, superposed on the stem, generally linear or ensiform. *Inflorescence* spicate; flowers 1 to a spathe, sessile; spathe-valves linear or lanceolate. *Flowers* very various in size and colour.

Subgenus I. EUGLADIOLUS.—Perianth-tube funnel-shaped; segments not distinctly unguiculate.

Species of Europe and Western Asia.

- Seeds flat, winged.....Sp. 1-5.
 Seeds globose.....Sp. 6-8.
 Seeds unknown.....Sp. 9-15.

Species of the Cape and Tropical Africa.

Leaves subterete or linear.

Perianth-segments acute.....Sp. 16-31.

Perianth-segments obtuse.....Sp. 32-72.

Leaves ensiform.....Sp. 73-109.

Subgenus II. HEBA.—Perianth-tube short; segments distinctly unguiculate.

Spathes large.....Sp. 110-124.

Subgenus III. SCHWEIGGERA.—Flowers small; segments distinctly unguiculate.

Spathes small.....Sp. 125-126.

Subgenus IV. HOMOGLOSSUM.—Perianth-tube like that of a *Watsonia*; segments subequal.....Sp. 127-132.

The following key to eighty-one of the Cape species appears in *Flora Capensis* (Baker, 1896-97). The European, Asiatic, and central African species are of course not included.

Subgenus I. EUGLADIOLUS. Spathe-valves large, green, lanceolate; perianth-segments not distinctly unguiculate.

A. Leaves terete or linear:

Perianth-segments acute:

Perianth-tube $1\frac{1}{2}$ -2 in. long:

Leaves subterete:

Perianth-segments long and gradually pointed. (1) *grandis*.

Perianth-segments shortly pointed:

Perianth pale or slightly flushed with dark

lilac.....(2) *tristis*.

Perianth dark lilac.....(3) *recurvus*.

Leaves linear:

Segments with a short cusp.....(4) *angustus*.

Segments with a long cusp.....(5) *cuspidatus*.

Perianth-tube about an inch long:

Leaves subterete:

Flowers horizontal:

Flowers pink.....(6) *hastatus*.

Flowers blue-lilac.....(7) *gracilis*.

Flowers yellowish.....(8) *tenellus*.

Flowers suberect.....(9) *trichonemifolius*.

Leaves linear:

Flowers lilac.....(10) *vomerulus*.

Flowers yellowish.....(11) *strictus*.

Whole flower not above an inch long:

Leaf with scarcely any free point.....(12) *pubescens*.

Leaf slender, subterete.....(13) *lambda*.

Leaf linear, long.....(14) *rachidiflorus*.

Perianth-segments obtuse or obscurely cuspidate:

Stem-leaves with only very short, free points:

Sheaths glabrous:

Flowers pink or lilac:

Perianth-tube half as long as the segments.. (15) *microphyllus*.

Perianth-tube as long as the segments.....(16) *brevifolius*.

Perianth-tube longer than the segments.... (17) *tabularis*.

Flower-segments white with a red keel.....(18) *inandensis*.

Sheaths pilose.....(19) *Woodii*.

Stem-leaves with long, free points:

Leaves subulate or very narrow:

Flowers erect or suberect:

- Segments shorter than the tube..... (20) *tenuis*.
- Segments equalling the tube..... (21) *debilis*.
- Segments rather longer than the tube..... (22) *Bolusii*.
- Segments 2-3 times the length of the tube:
- Flowers bright lilac..... (23) *biflorus*.
- Flowers pale yellow..... (24) *erectiflorus*.

Flowers horizontal with a curved tube:

Flowers 1-4 in a spike:

Upper segments $\frac{1}{3}$ - $\frac{1}{2}$ in. broad:

- Flowers white..... (25) *cochleatus*.
- Flowers bright red..... (26) *Rogersii*.
- Flowers pink..... (27) *Pappei*.

Upper segments $\frac{1}{2}$ - $\frac{3}{4}$ in. broad:

- Corm-tunics of fine fibres..... (28) *inflatus*.
- Corm-tunics of wiry strands..... (29) *spathaceus*.

Flowers many in a spike..... (30) *involutus*.

Leaves linear:

Leaf-sheaths glabrous:

- Perianth-tube $1\frac{1}{2}$ in. long..... (31) *hyalinus*.
- Perianth-tube 1 in. long..... (32) *vittatus*.
- Perianth-tube $\frac{3}{4}$ in. long..... (33) *striatus*.
- Perianth-tube $\frac{1}{3}$ - $\frac{1}{2}$ in. long:

Segments half as long as the tube..... (34) *paludosus*.

Segments twice the length of the tube:

Produced leaves 2..... (35) *niveni*.

Produced leaves 3-4:

Stamens half as long as limb..... (36) *punctatus*.

Stamens as long as the lower segments (37) *brachyscyphus*.

Leaf-sheaths hairy..... (38) *villosus*.

B. Leaves ensiform.

Parviflori. Perianth-tube under an inch long.

Spikes equilateral; flowers very numerous:

Flowers red:

Perianth-tube $\frac{1}{3}$ in. long..... (39) *crassifolius*.

Perianth-tube $\frac{3}{4}$ in. long..... (40) *Elliotii*.

Flowers yellow:

Stem pubescent..... (41) *Ludwigii*.

Stem villose..... (42) *sericeo-villosus*.

Spikes secund; flowers fewer:

Flowers yellow..... (43) *ochroleucus*.

Flowers red:

Upper segments $\frac{1}{2}$ in. broad:

Perianth-tube $\frac{1}{2}$ in. long..... (44) *Kirkii*.

Perianth-tube $\frac{3}{4}$ in. long..... (45) *Eckloni*.

Upper segments $\frac{3}{4}$ in. broad; two inner lower with a large dark blotch:

Flowers yellow..... (46) *purpureo-auratus*.

Flowers purple:

Outer spathe-valve $1-1\frac{1}{2}$ in. long..... (47) *Papilio*.

Outer spathe-valve $1\frac{1}{2}$ -2 in. long..... (48) *Rehmanni*.

Blandi. Perianth-tube 1-2 in. long; flowers white or pale red.

Segments obovate, obscurely pointed:

Sheaths and leaves hairy:

Segments as long as the tube..... (49) *hirsutus*.

Segments shorter than the tube..... (50) *salmonaeus*.

Sheaths and leaves glabrous:

Perianth-tube $1-1\frac{1}{4}$ in. long..... (51) *scaphochlamys*.

Perianth-tube $1\frac{1}{2}$ -2 in. long..... (52) *floribundus*.

Segments oblong, distinctly pointed:

Perianth-tube curved:

Segments $\frac{1}{2}$ – $\frac{1}{2}$ in. broad..... (53) oppositiflorus.

Segments $\frac{1}{2}$ –1 in. broad..... (54) blandus.

Perianth-tube nearly straight:

Segments nearly concolorous..... (55) Milleri.

Segments with a bright red central band..... (56) undulatus.

Cardinales. Flowers large, bright red, with a nearly straight tube, and upper segments not distinctly hooded.

Segments subequal, shorter than the tube..... (57) Macowani.

Upper segments as long as the tube..... (58) Adlami.

Segments unequal, longer than the tube:

Upper segments $\frac{3}{4}$ –1 in. broad..... (59) cardinalis.

Upper segments obovate, 1–1½ in. broad:

Lower bracts 1½–2 in. long..... (60) splendens.

Lower bracts 3–6 in. long..... (61) cruentus.

Dracocephali. Flowers large, with a much-curved tube and upper segments hooded.

Flowers dull-coloured:

Leaves $\frac{3}{4}$ –1 in. broad..... (62) dracocephalus.

Leaves 1–2 in. broad..... (63) platyphyllus.

Flowers bright red:

Limb shorter than the tube..... (64) psittacinus.

Limb as long as the tube:

Perianth 2–3 in. long..... (65) Leichtlinii.

Perianth 4 in. long..... (66) Tysoni.

Limb longer than the tube..... (67) Saundersii.

Flowers bright yellow..... (68) aurantiacus.

Subgenus II. *HEBEA*. Spathe-valves large, green, oblong-lanceolate. Perianth-segments all with a narrow claw.

Side-segments about $\frac{1}{2}$ in. broad:

Flowers red:

Leaves with many close equal ribs..... (69) alatus.

Leaves with only a thickened midrib and edge..... (70) spathulatus.

Flowers greenish-yellow..... (71) orchidiflorus.

Side-segments about $\frac{1}{3}$ in. broad:

Flowers dull reddish..... (72) pulchellus.

Flowers yellowish..... (73) bicolor.

Side-segments about $\frac{1}{4}$ in. broad:

Stems stout; flowers few to a spike..... (74) arcuatus.

Stems slender; flowers many to a spike:

Segments cuspidate:

Upper segments 1–1¼ in. long..... (75) formosus.

Upper segments $\frac{3}{4}$ –1 in. long:

Tunics of fine parallel fibres..... (76) edulis.

Tunics lacerated from the base..... (77) Scullyi.

Segments not cuspidate:

Claw of upper segments very narrow..... (78) Dregei.

Claw of upper segments not very narrow..... (79) permeabilis.

Subgenus III. *SCHWEIGGERA*. Spathe-valves small, brown, rigid. Segments all with a distinct slender claw and small blade.

Perianth-limb $\frac{1}{2}$ – $\frac{3}{4}$ in. long..... (80) arcnarius.

Perianth-limb 1 in. long..... (81) montanus.

Of the Cape species included in the foregoing key, *Gladiolus erectiflorus*, *G. inflatus*, and *G. platyphyllus* are new species and were not described in Baker's *Handbook of the Irideæ*.

Many species from other parts of the world are described in the last-named work. The fifteen European and Asiatic species are named on

pages 199 to 202. The following are from tropical Africa: *andongensis* Welw. ex Baker; *angolensis* Welw. ex Baker; *atropurpureus* Baker; *benguellensis* Baker; *brachyandrus* Baker; *brevicaulis* Baker; *Buchanani* Baker; *Buettneri* Pax; *coerulescens* Baker; *corneus* Oliv.; *decoratus* Baker; *Grantii* Baker; *gregarius* Welw.; *Hanningtoni* Baker; *kilimandscharicus*



FIG. 5. GLADIOLUS LEICHTLINII BAKER

Pax; *laxiflorus* Baker; *luridus* Welw.; *Melleri* Baker; *micranthus* Baker; *multiflorus* Baker; *newii* Baker; *Oatesii* Rolfe; *pauciflorus* Baker; *primulinus* Baker; *Quartinianus* A. Rich.; *splendens* Baker; *sulphureus* Baker; *Thomsoni* Baker; *unguiculatus* Baker; *Welwitschii* Baker; *zambesiacus* Baker. From central Madagascar are reported *G. Garnieri* Klatt and *G. luteus* Lam. Further study has resulted in the discovery that *G. andongensis* Welw. ex Baker, *G. angolensis* Welw. ex Baker, *G. kilimandscharicus* Pax, *G. newii* Baker, *G. primulinus* Baker, and *G. Welwitschii* Baker, are really synonyms of *G. Quartinianus* A. Rich.

Since the publication of the *Handbook of the Iridæ* and the *Flora Capensis*, a number of species of *Gladiolus* from tropical

Africa and elsewhere have been described. Some of these have been published by Mr. Baker and are therefore new species. Others have been described by persons who have not made any monographic studies on the genus. It is not improbable that some of them are forms of the apparently very variable *G. Quartinianus* A. Rich or of other known species. A few new specific names have appeared among the European

species, but it is not probable that the supposed new species of Jordan are more than varietal forms of species already known.

The following is a complete list of the supposed new species from Europe and Africa:

- affinis* De Wild.
antunesii Baker, 1897
aphanophyllus Baker, 1898
Arnoldianus De Wild.
arvaticus Jord.
atrorubens Brown, 1914
Bakeri Klatt, 1893
Baumi Harms
bellus Wright, 1906
brachylimbus Baker
brevispathus Klatt, 1893
calothyrsus Vaupel, 1912
carmineus Wright, 1906
Carsoni Baker, 1895
caudatus Baker, 1895
Conrathi Baker
cyclocarpus Jord.
cymbarinus Baker
decipiens Vaupel, 1912
densiflorus Baker
elegans Vaupel, 1912
Ellom Baker, 1890
Flanaganii Baker
flexuosus Baker, 1894
fusco-viridis Baker
gallacensis Vaupel, 1912
garuanus Vaupel, 1912
Gawleri Jord.
gazensis Rendle
germanicus Jord.
glaucus Heldr., 1896
Goetzei Harms, 1900
gracillimus Baker, 1895
Hanru Jord.
Harmsianus Vaupel, 1912
heterolobus Vaupel, 1912
inconspicuus Baker
Johnstoni Baker, 1897
junodi Baker
karendensis Baker
kubangensis Harms
Lannesii Jord.
linearifolius Vaupel, 1912
littoralis Jord.
longanus Harms
Mackinderi Hook.
macrophlebius Baker, 1898
malangensis Baker
Masoniorum Wright, 1910
massoni Klatt, 1893
masukuensis Baker, 1897
micranthus Baker
microsiphon Baker
mirus Vaupel, 1912
morrumbalaensis De Wild.
mosambicensis Baker
Münzneri Vaupel, 1912
numidicus Jord.
nyikensis Baker, 1897
oliganthus Baker, 1898
oligophlebius Baker
oreocharis Schltr., 1896
pallidus Baker, 1898
platyphyllus Baker, 1893
porrigeus Jord.
pretorius Kuntze
prismatosiphon Schltr., 1899
puberulus Vaupel, 1912
pubescens Pax
punctatus Dam., 1889
quilimanensis Baker, 1898
reductus Baker
remorifolius Baker
rigescens Jord.
rigidifolius Baker
rupicola Vaupel, 1912
ruricola Jord.
Schlechteri Baker
spectabilis Baker
Staudtii Vaupel, 1912
stenophyllus Baker, 1897
subaphyllus Brown, 1909
subulatus Baker, 1898
Taubertianus Schltr., 1899
trichostachys Baker
triloniaeformis Kuntze
trilonoides Baker, 1895
uhehensis Harms, 1900
venulosus Baker, 1897
Verdickii De Wild.
vexillare Martelli
Whytei Baker, 1897

The reader is reminded that plants of these species, as well as of the majority of the species that have been known longer, are not offered by dealers in plants — are not procurable even from botanical gardens; and that the specimens of these species are to be found in European herbaria which the writer has not had the opportunity to examine. The writer, therefore, cannot vouch for the authenticity of any of these

names as distinct species, nor can a complete key be made of all the species. It is desired, however, to call attention to the present status of the subject, and it is hoped that some person favorably located may carry forward the work so ably begun by Mr. Baker and Dr. Klatt.

The following list of synonyms is as complete as present knowledge of the genus will admit:

- affinis* Pers. = *cuspidatus* Jacq.
alatus Jacq. = *orchidiflorus*
albidus Jacq. = a variety of *blandus*
aleppicus Boiss. = *atroviolaceus*
algoensis Sweet = *alatus* Linn.
alpigenuus C. Koch, 1848 = *illyricus*
ambiguus Roem. & Schult. = *hirsutus*
andongensis Welw. ex Baker = *Quartinianus*
Andrewsii Klatt = *brevifolius* Jacq.
angolensis Welw. ex Baker = *Quartinianus*
angustifolius Salisb. = *angustus* Linn.
angustus Herb. Linn. = *blandus*, *undulatus*
angustus Jacq. ex Thunb. = *hastatus*
angustus Thunb. = *undulatus*
aphyllus Ker-Gawl., 1827 = *brevifolius*

biflorus Roem. & Schult. = *hirsutus*
bimaculatus Lam. = *involutus* De la Roche
binervis Sweet = *grandis*
Borneti Ardoino = *segetum*
Boucheanus Schlecht., 1832 = *palustris*
brevicollis Klatt = *brevifolius* Jacq.
Breytianus Ker-Gawl., 1827 = *recurvus*
byzantinus Bieb. = *segetum*
byzantinus Coss ex Ball, 1878 = *illyricus*

calvatus Baker = a variety of *Ludwigii*
campanulatus Andr. = var. *carneus* of *G. blandus*
carinatus (Soland.) Ait. = *recurvus*
carneus Andr. = *brevifolius*
carneus De la Roche = var. *carneus* of *G. blandus*
carneus Herb. Banks = *hirsutus*
carneus Jacq. = var. *ventricosus* of *G. cuspidatus*
carneus Klatt = *Eckloni*
caucasicus Herb., 1842 = *segetum*
citrinus Klatt = *trichonemifolius*
cochleatus Baker, 1876 = *unguiculatus*
collinus Salisb. = *communis*
communis Cav. = *illyricus*
communis Linn. in part = *segetum*
communis Thunb. = *carneus*
communis Vahl. in part = *byzantinus*
commutatis Bouché = *segetum*
concolor Salisb. = var. *concolor* of *G. tristis*
Cooperi Baker = var. *Cooperi* of *G. psittacinus*
cordatus Thunb. = *angustus*
crispiflorus Herb., 1842 = *imbricatus*
cuspidatus Andr. = var. *ventricosus* of *G. cuspidatus*

dalmaticus Tausch = *segetum*
dichotomus Thunb. = *permeabilis* De la Roche
dubius Guss. = *illyricus*
dubius Parl. = *spathaceus*

elatus Balb. = *byzantinus*
elongatus Thunb. = *grandis*
ensifolius Baker = *cuspidatus* Jacq.
equitans Thunb. = var. *namaquensis* of *G. alatus*
excelsus Ker-Gawl. = *blandus*

fasciatus Roem. & Schult. = *vittatus*
festivus Herb., 1844 = *brevifolius*
flabellifer Tausch, 1836 = *oppositiflorus*
floribundus Hort. Batav. ex Tausch = *oppositiflorus*
formosus Pers. = *straitus*

galeatus Burn. = *alatus*
galiciensis Bess. = *imbricatus*
Gawleri Klatt = a variety of *Watsonius* Thunb.
gracilis Licht. = *scaber*
grandiflorus Andr. = *floribundus*
Gueinzii Hunze, 1847 = *blandus*
Guepini Koch, 1840 = *segetum*

hastatus Ker = *vomerulus* Ker
hirsutus Ker = *villosus*
hirtus Steud. = *hirsutus*
hygrophilus Boiss. ex Baker, 1877 = *imbricatus*

inarimensis Guss. = *segetum*
infestus Bianca = *segetum*
italicus Miller = *communis*

kilimandscharicus Pax = *Quartinianus*

laccatus Thunb. = *villosus*
laevis Thunb. = *grandis*
Lamarckii Roem. & Schult. = *villosus*
Lemonia Pourr. ex Steud. = *blandus*
leucanthus Bouché = *segetum*
libanoticus Boiss. = a variety of *imbricatus*
liliaceus Hoult. = *angustus*, *gracilis*, etc.
Ludoviciae Jan. = *segetum*
luridus Hornem. = *trichonemifolius*
luteus Klatt in part = *bicolor*

Macowaniensis Klatt, 1885 = *angustus*
maculatus Sweet = *recurvus* Linn.
Marchallii Poir. = *imbricatus*
monostachyus Roem. & Schult. = *hastatus*, etc.
Mortonianus Steud. = *blandus*
Mortoni Herb. = *blandus*
mucronatus Lam. = *hirsutus*

namaquensis Ker-Gawl. = var. *namaquensis* of *G. alatus*
narbonensis Bud. = *illyricus*
natalensis Reinw. = *psittacinus*
neglectus Schult. = *palustris*
newii Baker = *Quartinianus*
notarisii Parl. = *communis*

odorus Salisb. = *recurvus*
oppositifolius Hort., 1893 = *oppositiflorus*
orchidiflorus Pers. non Andr. = *arenarius*
ornatus Klatt, 1885 = *inflatus*
orobranche Red. Lil. = *brevifolius* Jacq.

papilionaceus Lichtst. = *alatus* Linn.
parviflorus Jacq. = *montanus* Linn.
pauciflorus Berdaw = *imbricatus*
petraeus Boiss. = *atroviolaceus*
pictus Sweet = *blandus*
pilosus Eckl. = *villosus*
pratensis Dietr. = *palustris*
primulinus Baker, 1890 = *Quartinianus*
pterophyllus Pers. = *gracilis* Jacq.
punctatus Jacq. = *recurvus* Linn.
punctulatus Schrank, 1822 = *villosus* (?)
puniceus Lam. = *villosus* Ker

Raddeanus Trantv., 1875 = *imbricatus*
ramosus Baker = a variety of *montanus* Linn.
Reuteri Boiss. = var. *Reuteri* of *G. illyricus*
ringens Andr. = *recurvus*
ringens var. *undulatus* Andr. = *niveni* Baker
ringens Eckl. = *inflatus*
roseus Andr. = *hirsutus*
rossicus Pers. = *imbricatus*
rubromarginatus Schrad. = *hirsutus*

sagittifer Salisb. = *blandus* (?)
sallatorum Baker, 1875 = *Quartinianus*
schimperianus Steud. ex Baker, 1877 = *Quartinianus*
segetalis St. Lag. = *segetum*
serotinus Welw. = var. *Reuteri* of *G. illyricus*
serotinus Willd. = *illyricus*
setifolius Eckl. = *gracilis*
spathaceus Parl. = *segetum*
speciosus Eckl. = *cardinalis*
speciosus Thunb. = *alatus*
spilanthus Klatt in part = *brevifolius* Jacq.
spilanthus Klatt in part = *hastatus* Thunb.
spilanthus Spreng. ex Baker, 1877 = *gracilis*
spiralis Pers. = *tristis*
splendens Welw. ex Baker = *Quartinianus*
striatus Andr. = *undulatus*
strictus Jacq. = *hyalinus*
suaveolens Ker. = *recurvus*
subbiflorus Boiss. = *imbricatus*
sulcatus Lam. = *mollis*

tabularis Pers. = *montanus* Linn.
Taylorianus Rendle = *Quartinianus*
telifer Stokes = *angustus*
Templemanii Klatt, 1885 = *bicolor* Baker
tenuiflorus C. Koch, 1848 = *illyricus*
tenuis Bieb. = *imbricatus*
tenuis Salzm. = *palustris*
Thumborgii Eckl. = *hastatus*
tigrinus Eckl. ex Baker, 1877 = *vomerulus* Ker.
trimaculatus Lam. = *angustus*
triphyllus Bertol. = *palustris*
tristis Herb. Linn. ex Baker, 1877 = *grandis*
tristis Thunb. = *tenellus*

undulatus Linn. in part = *cuspidatus* Jacq.
undulatus Scheev. = *vittatus*
uniflorus Klatt, 1882 = *alatus*

ventricosus Lam.= var. *ventricosus* of *G. cuspidatus*
versicolor Andr.= *grandis*
villosiusculus Soland. ex Baker = *villosus*
vinulus Klatt, 1885 = *vittatus*
violaceus Pers.= *recurvus*
viperatus Ker-Gawl.= *orchidiflorus*
virescens Thunb.= *orchidiflorus*
vittatus Zuccag.= *undulatus* Jacq.

Welweitschii Baker, 1878 = *Quartini*

The following species have been described as gladioli, but belong to other genera:

abbreviatus Andr.= *Antholyza quadrangularis*
aequinotialis Herb., 1842 = *Acidanthera aequinotialis*
aletroides Vahl.= *Watsonia aletroides*
alopécuroides Linn.= *Watsonia plantaginea*
alopécuroides Linn.= *Watsonia spicata*
amabilis Salisb.= *Lapeyrousia juncea*
amoenus Roem. & Schult.= *Tritonia rosea*
amoenus Salisb.= *Watsonia meriana*
anceps Linn. in part = *Lapeyrousia compressa*
anceps Linn. ex Baker, 1877 = *Lapeyrousia Fabricii*
angustifolius Lam.= *Babiana tubiflora*
antholyza Poir.= *Antholyza nervosa*

bicolor Thunb.= *Synnotia bicolor*
biflorus Thunb.= *Salemoneus biflorus*
bracteatus Thunb.= *Lapeyrousia fissifolia*
bracteolatus Lam.= *Watsonia punctata*
Burmanni Schrank, 1822 = *Ixia Burmanni*

capitatus Linn.= *Aristea capitata*
caryophyllaceus Poir.= *Watsonia humilis*
caryophyllus Houtt.= *Watsonia brevifolia*
coccineus Schrank, 1822 = *Ixia speciosa*
crispus Linn.= *Tritonia crispa*
crocatu Pers.= *Tritonia crocata*
cunonia Gaert.= *Antholyza cunonia*

denticulatus Lam.= *Lapeyrousia Fabricii*
distichus Roem. & Schult.= *Babiana distichia*

elongatus Salisb.= *Babiana tubiflora*
excisus Jacq.= *Lapeyrousia juncea*
exscapus Thunb.= *Acidanthera tubulosa*

Fabricii Thunb.= *Lapeyrousia Fabricii*
falcatus Linn.= *Lapeyrousia Fabricii*
fissifolius Jacq.= *Lapeyrousia fissifolia*
fistulosus Jacq.= *Watsonia spicata*
flavus Soland.= *Tritonia flava*
flexuosus Linn.= *Acidanthera tubulosa*
flexuosus Thunb.= *Acidanthera flexuosa*
fragrans Jacq.= *Babiana plicata*

galeatus Jacq.= *Synnotia galatea*
Garnieri Klatt (in Decken, Reis. Bot. 3: 73) = *Antholyza Watsonioides*
glumaceus Thunb.= *Watsonia rosea*
gramineus Linn.= *Melasmaerula graminea*

inclinatus Red. Lil. = *Babiana tubiflora*
indicus Miller = *Ferraria undulata*
infundibuliformis Schrank, 1822 = *Watsonia meriana*
iridifolius Jacq. = *Watsonia meriana*
ixioides Thunb. = *Tritonia paniculata*

junceus Burm. = *Lapeyrousia juncea*

laccatus Jacq. = *Watsonia humilis*
laceratus Burm. = *Tritonia crispa*
latifolius Lam. = *Babiana obtusifolia*
laxus Thunb. = *Meristostigma laxa*
lineatus Salisb. = *Tritonia lineata*
lomenia J. F. Gmel. = *Lomenia borbonica*
longicollis Baker, 1876 = *Acidanthera platyphylla*
longiflorus Andr. = *Babiana tubata*
longiflorus Herb. Linn. ex Baker, 1877 = *Acidanthera tubulosa*
longiflorus Jacq. = *Tritonia pallida*
longiflorus Linn. Suppl. = *IXIA paniculata*
lucidor Baker = *Homoglossum lucidor* Baker

marginatus Linn. = *Watsonia marginata*
marmoratus Lam. = *Lapeyrousia juncea*
merianellus Thunb. = *Antholyza merianella*
merianus Thunb. = *Antholyza aletroides*
minor Baker = *Antholyza Watsonioides*
minutiflorus Schrank, 1822 = *Watsonia plantaginea*
mucronatus Jacq. = *Babiana mucronata*
mucronatus Red. Lil. = *Babiana stricta*

nanus Andr. = *Babiana rosea*
nervosus Ba cer = *Antholyza nervosa* Thunb.
nervosus Lam. = *Babiana stricta*

odor Schrank = *IXIA fragrans*

paniculatus Pers. = *Lapeyrousia juncea*
papilionaceus Vahl. = *Watsonia Lamarckii*
pectinatus Soland. ex Baker, 1877 = *Tritonia crispa*
plantagineus Pers. = *Watsonia plantaginea*
plicatus Jacq. = *Babiana distichia*
plicatus Linn. = *Babiana stricta*
plicatus Thunb. = *Babiana plicata*
polystachyus Andr. = *Lapeyrousia juncea*
polystachyus Thunb. = *Babiana plicata*
Pottsii McNab = *Tritonia Pottsii*
praecox Andr. = *Antholyza revoluta*
punctatus Roem. & Schult. = *Watsonia punctata*
puniceus Vahl. = *Babiana stricta*
purpureus Vahl. = *Babiana villosa*
pygameus Roem. & Schult. = *Babiana sulphurea*
pyramidalis Andr. = *Watsonia rosea*
pyramidalis Lam. = *Watsonia iridiflora*

quadrangularis Ker-Gawl. = *Antholyza quadrangularis*

ramosus Linn. = *Melaspheerula graminea*
ramosus Murr. = *Moraea ramosa*
recurvus Houtt. = *Antholyza revoluta*
recurvus Thunb. = *Hesperantha radiata*
reflexus Lichtst. = *Babiana plicata*
refractus Jacq. = *Freesia refracta*

resubspinatus Pers. = *Freesia refracta*
ringens Thunb. = *Babiana coronata*
roseo-albus Jacq. = *Watsonia inderianus*
roseus Jacq. = *Tritonia rosea*
roseus Willd. = *Ixia amoena*
rubens Vahl. = *Watsonia punctata*
rubrocyaneus Vahl. = *Babiana stricta*

secundus Thunb. = *Babiana secunda*
securiger Soland. = *Tritonia securiger*
setifolius Linn. = *Lapeyrousia juncea*
silenoides Jacq. = *Lapeyrousia silenoides*
sparmanni Thunb. = *Freesia refracta*
spatheceus Linn. = *Babiana spathacea*
spicatus Lam. = *Watsonia Lamarckii*
spicatus Linn. = *Watsonia spicata*
splendens Herb., 1843 = *Antholyza caffra*
Sprengelianus Schult. = *Watsonia stricta*
stenophyllus Schrank, 1822 = *Babiana plicata*
stoloniferous Salisb. = *Antholyza aethiopica*
striatus Herb. Banks = *Watsonia rosea*
striatus Soland. ex Baker, 1876 = *Tritonia Bakeri*
strictiflorus Belile = *Watsonia humilis*
strictus Soland. = *Babiana stricta*
subulatus Vahl. = *Watsonia punctata*
sulphureus Jacq. = *Babiana stricta*

testaceus Vahl. = *Watsonia brevifolia*
Thunbergii F. G. Diet. = *Acidanthera tubulosa*
triticeus Thunb. = *Watsonia plantaginea*
tubatus Jacq. = *Babiana tubata*
tubiflorus Linn. = *Babiana tubiflora*
tubulosus Burm. = *Watsonia spicata*
tubulosus Jacq. = *Watsonia aletroides*

venosus Willd. = *Tritonia lineata*
villosulus Roem. & Schult. = *Babiana stricta*
villosus Burm. = *Synnotia bicolor*
villosus Vahl. = *Babiana stricta*
viridis Aiton = *Tritonia viridis*

Watsonioides Baker = *Antholyza Watsonioides*
Watsonius Thunb. = *Antholyza revoluta*

xanthospilus Red. Lil. = *Freesia refracta*

Brief descriptions of some species of *Gladiolus* are given in the following table:

GLADIOLUS SPECIES

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
<i>alatus</i> Linn.	Cape Colony	.....	6-12	3-5	Bright red
<i>alatus</i> var. <i>namaquensis</i> Ker.	Namaqualand	.....	.....	.....	White, three lower segments with bright purple spots
<i>angustus</i> Linn.	Cape Colony	1756	24-36	2-6	Purple White
<i>antunesii</i> Baker, 1898	Angola	.....	18-24	.....	Pinkish, with a greenish tube
<i>aphanophyllus</i> Baker, 1898	British Central Africa	.....	6-12	.....	Bright red or yellow
<i>arcuatus</i> Klatt, 1882	Little Namaqualand	.....	6	2-6	Violet-spotted
<i>arenarius</i> Baker, 1876	Cape Colony	.....	12-18	.....	Bright dark purple
<i>Arnoldianus</i> De Wild., 1901	Katanga	.....	15	4-5	Dark red
<i>atropurpureus</i> Baker, 1876	Zambezi Highlands	1876	12	6-9	Dark purple
<i>atrorubens</i> Brown, 1914	Transkei	.....	18-24	4-9	Bright orange yellow, sometimes tinged red
<i>atroviolaceus</i> Boiss., 1853	Palestine	.....	12-18	4-8	Bright yellow
<i>aurantiacus</i> Klatt, 1867	Natal	1886	36	12	Bright red, throat mottled purple on a yellow ground
<i>aureus</i> Baker, 1897	Cape Colony	.....	6-12	1-2	Dull yellow
<i>bellus</i> Wright, 1906	British Central Africa	.....	15-18	8-10	Bright lilac
<i>benguellensis</i> Baker, 1877	Angola	.....	12	6-12	White, tinged red
<i>bicolor</i> Baker, 1876	Cape Colony	.....	6-9	2-3	Bright pink
<i>biflorus</i> Klatt, 1885	Cape Colony	.....	6-8	2-3	Reddish white
<i>blandus</i> Aiton, 1789	Cape Colony	1774	12-18	4-8	Bright lilac
<i>Bolusii</i> Baker, 1892	Winterhoek Mountain	.....	18-24	2-4	Pink or lilac, lower segments with pur- plish marks in throat
<i>brachyandrus</i> Baker	Zambezi Highlands	1879	12	8-10	Pale red
<i>brachysephus</i> Baker, 1892	East Griqualand	.....	18-24	2-6	Yellow, minutely spotted brown
<i>brevicaulis</i> Baker, 1877	Lower Congo	.....	6-8	6-15	Dark purple, lower segments with a white line down center
<i>brevifolius</i> Jacq.	Cape Colony	.....	12-24	4-12	Bright yellowish rose
<i>Buchananii</i> Baker, 1892	Zambezi Highlands	.....	12-18	6-8	
<i>Buettneri</i> Pax, 1892	Togoland	.....	24-36	.....
<i>byzantinus</i> (Bauhin) Miller	Mediterranean region	.....	18-24	Many	
<i>calothyrsus</i> Vaupel, 1912	German East Africa	.....	36	14	

<i>cardinalis</i> Curt, 1791.....	Cape Colony.....	1789.....	24-36 18	12-20 5	Bright scarlet, blotched white in throat Carmine, two inner lobes with a paler spot surrounded by a darker border Pink
<i>carmineus</i> Wright, 1906.....	South Africa.....	.....	.....	.....	.....
<i>caudatus</i> Baker, 1895.....	British Central Africa.....	.....	12-18	Few	White, with purple mark in throat
<i>cochleatus</i> Sweet, 1832.....	Lion Mountain.....	.....	6-18	1-2	Dull purple
<i>coeruleus</i> Baker, 1877.....	Angola.....	.....	12-18	2-3	Bright purple, lower segments with a white line down center
<i>communis</i> Linn.....	Central Europe.....	.....	12-18	4-8	Horn-colored Bright red
<i>corneus</i> Oliver, 1875.....	Lake Tanganyika.....	.....	24	4	Bright scarlet, lower segments with a large white blotch, and with red spots in throat
<i>crassifolius</i> Baker, 1876.....	Natal.....	.....	24-36	Numerous	White or pale pink, lower segments with a purple blotch
<i>cruentus</i> Moore, 1868.....	Natal.....	1868	24-36	6-10	Pink
<i>cuspidatus</i> Jacq.....	Cape Colony.....	.....	24-36	4-8	White, two inner segments with a lilac or claret red blotch in throat
<i>cuspidatus</i> var. <i>ensifolius</i> Baker.	Cape Colony.....	.....	.....	.....	Rose
<i>cuspidatus</i> var. <i>venuricosus</i> Lam.	Cape Colony.....	.....	16-20	1-3	Bright purple, lower segments with a very large pale blotch
<i>debilis</i> Ker, 1825.....	Cape Colony.....	.....	12-18	10	Bright yellow
<i>decipiens</i> Vaupel, 1912.....	Katanga.....	.....	36	6-12	Yellowish green, minutely grained claret-purple
<i>decoratus</i> Baker, 1876.....	Morambella.....	1887	24-36	.....	Purple
<i>deiodes</i> Wright (G. <i>sulphureus</i> Baker, 1877).....	German East Africa.....	.....	12	7-8	Bright red, copiously and minutely spotted purple-red
<i>dracocephalus</i> Hook f, 1871.....	Natal.....	1870	24	3-6	Pale lilac
<i>Dregei</i> Klatt, 1863.....	Little Namaqualand.....	.....	3-6	6-9	White
<i>Eckloni</i> Lehm., 1836.....	Cape Colony.....	.....	18-36	6-12	Claret red
<i>edulis</i> Burch., 1816.....	Cape Colony.....	.....	12-24	8-15	White, veined and flushed bright purple
<i>elegans</i> Vaupel, 1912.....	Nyassaland.....	.....	10-12	6	Bright crimson
<i>Elliotii</i> Baker, 1891.....	Transvaal.....	.....	12	.....	White, tinged dull purple
<i>erectiflorus</i> Baker, 1896.....	British Central Africa.....	.....	12	2-3	Bright yellow
<i>flanaganii</i> Baker, 1897.....	Basutoland.....	.....	6	Few	White, with a pink tinge
<i>flexuosus</i> Baker, 1894.....	British Central Africa.....	.....	12-18	2-3	Bright mauve purple
<i>florentiae</i> Marl., 1907.....	South Africa.....	.....	6	Many	Minutely striped claret-brown on a greenish ground
<i>floribundus</i> Jacq.....	Cape Colony.....	.....	18-24	4-12	.....
<i>formosus</i> Klatt, 1863.....	Cape Colony.....	.....	12-30	10-12	.....
<i>fusco-viridis</i> Baker, 1897.....	South Africa.....	1896	18-24	.....	.....

GLADIOLUS SPECIES (continued)

Species	Habitat	Intro- duced	Height (inches)	Number of flowers on a stalk	Color of flowers
<i>gallacensis</i> Vaupel, 1912	Gallabochland	.....	36	7	Fire red
<i>Garnieri</i> Klatt.	Madagascar	.....	18-36	4-6	Bright red
<i>garuanus</i> Vaupel, 1912	North Kamerun	.....	24-30	4	Yellow, dotted carmine with broad car- mine stripes in throat
<i>gazenis</i> Rendle, 1912	Gazaland	.....	9-10	.....	Purplish rose
<i>Goetzei</i> Harms, 1900	Uhehe	.....	9-12	Many	Yellow, dotted red
<i>gracilis</i> Jacq., 1787	Cape Colony	.....	12-24	2-6	Pale lilac-blue
<i>gracillimus</i> Baker, 1895	British Central Africa	.....	12-18	Few	Pale lilac
<i>grandis</i> Thunb., 1807	Cape Colony	.....	12-24	2-6	Yellowish white, more or less tinged purple-brown
<i>Grantii</i> Baker, 1892	Lake Tanganyika	.....	24-36	6-8	Yellowish
<i>gregarius</i> Welw., 1877	Angola	.....	12-18	10-12	Yellow, with two violet marks in throat
<i>halophilus</i> Boiss., 1853	Asia Minor	.....	6-9	2-5	Rose
<i>Hamingtoni</i> Baker, 1892	Mountains of tropical Africa	.....	9-12	12-20	Dark purple
<i>Harmsianus</i> Vaupel, 1912	South Angola	.....	.....	Many	White, with bright red sharlings
<i>hastatus</i> Thunb.	Cape Colony	.....	12-24	2-4	Pink
<i>heterolobus</i> Vaupel, 1912	North Kamerun	.....	24-30	8-14	Bright rose
<i>hirsutus</i> Jacq.	Cape Colony	.....	12	2	Yellow, dotted inside with red
<i>humilis</i> Stapf, 1885	Mesopotamia	.....	6-8	3	Yellow, dotted inside with red
<i>hvalinus</i> Jacq.	Cape Colony	.....	12	2	Bright purple
<i>illyricus</i> Koch	Europe	.....	12-18	3-6	Dark purple
<i>imbricatus</i> Linn.	Europe, Asia	.....	12-18	4-10	White, with a red keel outside
<i>inandensis</i> Baker, 1892	Natal	.....	12-18	6-8	Pink
<i>inflatus</i> Thunb.	South Africa	.....	12	1-4	Bright pink, with purple blotches in throat
<i>inflatus</i> De la Roche	Cape Colony	.....	18	4-8	Bright red
<i>Johnstoni</i> Baker, 1897	British Central Africa	.....	.....	.....	Pale pink, unspotted
<i>Kirkii</i> Baker, 1890	King William's Town	.....	36	.....	Dark violet-purple, darker purple line down center of lower segments
<i>Kotschyanus</i> Boiss., 1853	Persia	1886	12-24	4-12	Spotted reddish brown
<i>kubangensis</i> Harms	Angola	.....	18	1-2	

lambda Klatt, 1863.....	Cape Colony.....	.....	12	2	White, lower segments with two purple blotches at base
laxiflorus Baker, 1877.....	Angola.....	.....	12	4-6	Rose-purple
Leichtlinii Baker, 1889.....	Transvaal.....	.....	24	6-8	Bright red, lower segments red, at the tip yellow, with minute spots
linearifolius Vaupel, 1912.....	Katanga.....	.....	12-15	3-5	Deep lilac
Ludwigii Pappé, 1891.....	South Africa.....	.....	24-36	20-30	Pale yellow
luridus Welw., 1877.....	Angola.....	.....	12	10-12	Dull purple
luteolus Klatt.....	Portuguese East Africa.....	.....	36	.....	Yellowish
luteus Lam.....	Madagascar.....	.....	12	Many	Yellow
Mackinderi Hook, 1902.....	Mount Kenia.....	.....	24	5-6	Scarlet
Macowani Baker, 1892.....	South Africa.....	.....	24-36	6-10	Bright scarlet
macrophlebius Baker, 1898.....	Angola.....	.....	24	.....	Deep red
malangensis Baker.....	Angola.....	.....	24-30	8-10	Violet
Masoniorum Wright, 1910.....	Tembuland.....	.....	12	9-10	Cream, with pale yellow throat
masukuensis Baker, 1897.....	British Central Africa.....	.....	12-18	6-12	Lilac
Melleri Baker, 1876.....	Zambezi Highlands.....	.....	6-12	12-20	Bright red
micranthus Baker.....	Bechuanaland.....	.....	6-8	3	Bright purple
microphyllus Stapf, 1885.....	Asia Minor.....	.....	6-8	.....	Purple-violet
microphyllus Baker, 1892.....	East Griqualand.....	.....	12-18	4-5	Pale red
Milleri Ker, 1803.....	Cape Colony.....	1757	36-45	10-15	Milk white
mirus Vaupel, 1912.....	South Kamerun.....	.....	.....	.....	Upper segments rosy flesh, lower side segments blood red, lower middle segment rosy flesh with blood-red stripe
montanus Linn.....	Cape Colony.....	.....	24-36	Many	Pale red
multiflorus Baker, 1877.....	Angola.....	.....	12	.....	Bright purple
Münzneri Vaupel, 1912.....	Nyassaland.....	.....	18-20	4-6	Blue
niveni Baker, 1892.....	Cape Colony.....	1800	12	3-4	Bright lilac
nyikensis Baker, 1897.....	British Central Africa.....	.....	12	.....	Creamy white, veined red and tinged pink
Oatesii Rolfe.....	British Central Africa.....	.....	12-18	.....	White, tinged greenish brown
ochroleucus Baker, 1876.....	Tembuland.....	.....	30-36	8-12	Creamy yellow
oliganthus Baker, 1898.....	German East Africa.....	.....	9-12	.....	White
oligophlebius Baker, 1895.....	German East Africa.....	.....	12-18	Few	Pale pink
oppositiflorus Herb., 1842.....	.....	.....	36-48	30-40	White
orchidiflorus Andr.....	Cape Colony.....	.....	12-18	4-6	Greenish yellow
oreocharis Schltr., 1896.....	Cape Colony.....	.....	12	Few	.....
pallidus Baker, 1898.....	Angola.....	.....	24	.....	Pale pink
Pappéi Baker, 1892.....	Table Mountain.....	.....	.....	2-3	Pink
parviflorus Baker.....	Cilician Taurus.....	1877	.....	.....	Pale, unstriped

GLADIOLUS SPECIES (continued)

Species	Habitat	Intro- duced	Height (inches)	Number of flowers on a stalk	Color of flowers
<i>parvulus</i> Schltr.	Natal.	.....	12-15	2-4	Rose
<i>pauciflorus</i> Baker, 1877	Mount Kilimanjaro	.....	24-36	5-6	White, lower segments not blotched at center
<i>pernecabilis</i> De la Roche	Cape Colony	.....	12-24	6-12	Pale pink or lilac
<i>persicus</i> Boiss., 1853	Persia	.....	6-9	4-9	Pale purple
<i>platyphyllus</i> Baker, 1893	Natal	.....	18	.....	Deep yellow, with fine red lines
<i>primulinus</i> Baker, 1890	Tropical Africa	.....	18	4-5	Uniform primrose yellow
<i>prismatosiphon</i> Schltr., 1899	South Africa	.....	12-15	3-6	Pale rose, with purple dots
<i>psittacinus</i> Hook., 1830	South Africa	.....	36-48	Many	Upper segments dark crimson, lower segments red and yellow
<i>psittacinus</i> var. <i>Cooperi</i> Baker	.....	.....	36-48	Many	.....
<i>puberulus</i> Vaupel, 1912	Katanga	.....	15-18	7-10	Violet-red
<i>pubescens</i> Baker, 1876	Natal	.....	12-18	3-6	Pale pink
<i>pulehellus</i> Klatt, 1863	Cape Colony	.....	12	4-8	Pale red
<i>punctatus</i> Thunb.	Paard Island	.....	24	6-10	Greenish yellow
<i>purpureo-auratus</i> Hook. f., 1872	Natal	1872	36	10-15	Primrose yellow, two inner segments with red-brown blotch at throat
<i>Quartinianus</i> A. Rich., 1851	Mountains of tropical Africa	1884	24-48	6-9	Bright yellow or bright red
<i>quilimanensis</i> Baker, 1898	Portuguese East Africa	.....	24-30	.....	Bright pink
<i>rachidiflorus</i> Klatt, 1882	Port Natal	.....	24	Many	Reddish
<i>recurvus</i> Linn.	Cape Colony	.....	12-24	2-6	Yellowish white, much flushed with dark lilac. Very fragrant
<i>Rehmanni</i> Baker, 1892	Transvaal	.....	18-24	6-9	Bright red
<i>Rogersii</i> Baker, 1892	Cape Colony	.....	12	3	Bright red, without blotch in throat
<i>rupicola</i> Vaupel, 1912	West Usambara	.....	15-18	6	Red
<i>salmoncus</i> Baker, 1892	Cape Colony	.....	12	.....	Salmon-red
<i>Saundersii</i> Hook. f., 1870	Cape Colony	.....	24-36	6-8	Bright scarlet, three lower segments with a great blotch of white, spotted with scarlet in throat
<i>scaphochlamys</i> Baker, 1892	Cape Colony	.....	18-24	6-8	Pinkish white
<i>Scullyi</i> Baker, 1892	Little Namaqualand	.....	12-18	3-4	Reddish

segetum Ker, 1804.	Mediterranean region.	12-18	6-10	Bright purple, lower segments with a white central line
sericeo-villosus Hook., 1864.	Orange Free State.	36-48	20-30	Bright yellow
sintensii Baker, 1892.	Armenia.	8	Few	Dark violet
spathaceus Pappe, 1892.	Swartberg.	12-18	1	Pink
spathulatus Baker, 1892.	Transvaal.	12	4-5	Dull red
spicatus Klatt, 1868.	Guinea.	24	20	Bright purple
splendens Baker, 1876.	Cape Colony.	24	4-6	Bright scarlet, three lower segments with a pale keel through lower half
splendidus Rendle.	German East Africa.	36-48	7-8	Bright crimson
staudtii Vaupel, 1912.	Kamerun.	18-24	6	Shining red
stenophyllus Baker, 1897.	Cape Colony.	.....	.....	Red
striatus Jacq.	Cape Colony.	12	2-3	Yellowish and pale violet, streaked with red
strictus Jacq.	Cape Colony.	12	2-3	Yellowish, with purple dots and stripes
subaphyllus Brown, 1909.	Natal.	8-12	2-3	White, tinted pink
subulatus Baker, 1898.	Angola.	6-12	Few	Bright pink
sulphureus De Graaf, 1850.	Transvaal.	18	6-8	Pale golden yellow
tabularis Eckl., 1827.	Table Mountain.	12	5-6	White, with a tinge of pink
Taubertianus Schltr., 1899.	South Africa.	15-27	1-3	Pale violet
tenellus Jacq., 1787.	Cape Colony.	12-18	2-5	Yellowish white, tinged lilac, lower segments much spotted in throat
tenuis Baker, 1876.	Swellendam.	18-24	4-6	Pale pink
Thomsoni Baker, 1892.	Mountains near Lake Nyassa.	.....	6-12	Pale red
trichonemifolius Ker, 1811.	Cape Colony.	6-18	1-3	Yellow, three lower segments blotched purple in throat
tricolor Stapf, 1885.	Asia Minor.	6-8	3	Upper segments purple, lower segments white with purple blotches
triphyllus Sibth.	Cyprus.	6-9	2-3	Yellowish white, slightly flushed purple-black on keel. Fragrant
tristis Linn.	Cape Colony.	12-24	3-4	White
tristis var. concolor Salisb.	Cape Colony.	12-24	3-4	Pink or pale lilac
tritonooides Baker, 1895.	British Central Africa.	18-24	.....	Bright red
Tysoni Baker, 1892.	Cape Colony.	12	4-6	White, shaded with lilac
uhchenensis Harns, 1900.	Uhehe.	24	10-15	Milk white, with a red keel
undulatus Jacq.	Cape Colony.	12	4-6	Purple
unguiculatus Baker, 1876.	Sierra Leone.	12-18	6-10	White, veined claret-purple
venulosus Baker, 1897.	British Central Africa.	18	.....	Pale yellow to yellow, with violet veins
Verdictii De Wild., 1901.	Tukafu.	15-18	3-9	

GLADIOLUS SPECIES (*concluded*)

Species	Habitat	Introduced	Height (inches)	Number of flowers on a stalk	Color of flowers
villosus Ker, 1827	Cape Colony .....	.....	12-24	3-4	Bright red or lilac
vittatus Hornem., 1815	Cape Colony .....	.....	12	3-6	Pink, three lower segments with red or lilac central blotches
vomerulus Ker, 1827	Cape Colony .....	.....	12-18	2-3	Lilac, three lower segments blotched yellow in throat
Whytei Baker, 1897	British Central Africa...	.....	6-12	.....	Dark purple, lower segments white with dark purple spots
Woodii Baker, 1892	Natal and Transvaal...	.....	12-18	4-6	Dark red
zambesiacus Baker, 1892	Zambezi Highlands .....	.....	12-18	4-6	Pale purple
zanguebaricus Baker, 1898	Zanzibar .....	.....	12	5-6	Bright pink

The following described species are those concerned in the development of the cultivated gladiolus. The majority of them, if not all, are still offered in the catalogs of European dealers. Except as otherwise noted, the descriptions are from *Flora Capensis* (Baker, 1896-97).

G. alatus (Linn. Sp. Plant. edit. 2, 53); corm small, globose; tunics brown, membranous; basal leaves 3-4, linear, rigid in texture, the lowest the longest, $\frac{1}{2}$ -1 ft. long, $\frac{1}{8}$ - $\frac{1}{4}$ in. broad, closely and strongly ribbed; stem $\frac{1}{2}$ -1 ft. long including the inflorescence; spike usually simple, few-flowered, very lax, with a very flexuose axis; spathe-valves broad, green, oblong-navicular, the outer 1-1 $\frac{1}{4}$ in. long; perianth pink; tube $\frac{1}{2}$ in. long, funnel-shaped at the top; upper segment cucullate, obovate, cuneate, with a short claw, 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; side ones shorter, suborbicular, not unguiculate; 3 lower deflexed, with a small obovate blade and a long distinct claw; stamens reaching nearly to the tip of the upper segments; anthers lanceolate, $\frac{1}{4}$ in. long. *Thunb. Diss. No. 15, ex parte; Andr. Bot. Rep. t. 8; Ker in Bot. Mag. t. 586; Gen. Irid. 132; Baker, Handb. Irid. 223. G. speciosus, Thunb. Fl. Cap. i. 196. G. papilionaceus, Lichten. in Roem. et Schult. Syst. Veg. i. 408. Hebea galeata, Eckl. Top. Verz. 41.*

VAR. β , **G. namaquensis** (Ker in Bot. Mag. t. 592); more robust, with lanceolate leaves sometimes 1 $\frac{1}{2}$ -2 in. broad, 9-10 flowers, and upper perianth-segments an inch broad. *Ker, Gen. Irid. 132. G. equitans, Thunb. Fl. Cap. 192. G. galeatus, Andr. Bot. Rep. t. 122.*

G. atroviolaceus Boiss. Diagn. xiii. 14. [Description from Baker, 1892.] *G. aleppicus* and *petraeus* Boiss.—Corm ovoid, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; tunics of matted fibres, reticulated upwards. Leaves 3, firm, linear, closely ribbed, $\frac{1}{2}$ -1 ft. long, $\frac{1}{8}$ - $\frac{1}{4}$ in. broad. Stem slender, 1-1 $\frac{1}{2}$ ft. long. Flowers 4-8 in a lax secund spike; outer spathe-valve lanceolate, green, $\frac{3}{4}$ -1 in. long. Perianth-tube curved, narrowly funnel-shaped, $\frac{1}{3}$ in. long; limb dark purple, about an inch long; segments obovate, obtuse; upper $\frac{1}{3}$ in. broad; lateral shorter; 3 lower as long as the upper, with a claw as long as the blade. Anthers as long as the filaments, mucronate. Capsule oblong, torulose, $\frac{1}{2}$ in. long. Seeds globose, not winged.

G. blandus (Ait. Hort. Kew. i. 64); corm globose, middle-sized; tunics of parallel strands of matted fibres; produced subbasal leaves 4, ensiform, firm in texture, glabrous, the outer $\frac{1}{2}$ -1 ft. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; stem 1-2 ft. long including inflorescence, sometimes branched; flowers white with a tinge of red, 4-8 in a lax distichous spike, all ascending; outer spathe-valves green, lanceolate, 1 $\frac{1}{2}$ -2 in. long; perianth-tube about 1 $\frac{1}{2}$ in. long, much dilated and curved at the top; limb rather longer than the tube, segments oblong-spathulate, narrowed to a point, the top one about $\frac{3}{4}$ in. and the others about $\frac{1}{2}$ in. broad at the middle; stamens reaching more than halfway up the limb. *Ker. in Bot. Mag. t. 625; Gen. Irid. 140; Baker, Handb. Irid. 217. G. angustus, Linn. herb. ex parte!*

VAR. β , **G. albidus** (Jacq. Ic. t. 256); flower pure white. *G. blandus, Andr. Bot. Rep. t. 99. G. blandus. var. niveus, Ker in Bot. Mag. t. 648.*

VAR. γ , **G. Mortonius** (Herb. in Bot. Mag. t. 3680); flowers uberec; segments white, with copious, faint, vertical, pink streaks.

VAR. δ , **G. excelsus** (Sweet, Hort. Brit. edit. 2, 501); taller than the type, with longer leaves and a perianth-tube 2 in. long.

VAR. ϵ , **G. carneus** (Delaroché, Descr. 30, t. 4); more robust than the type, with more numerous, more spreading pink flowers, with broader, less acute segments. *G. campanulatus, Andr. Bot. Rep. t. 188. G. blandus, var., Ker in Bot. Mag. t. 654.*

VAR. *Hibbertii*, Hort., has pink flowers with very distinct, red, spade-shaped marks on the three lower segments.

G. byzantinus (Bankin), Miller, Dict. ed. vii. No. 3; Ker in Bot. Mag. t. 874; Reich. Ic. Crit., t. 643. [Description from Baker, 1892.] *G. elatus* Balb.—Corm globose, $\frac{3}{4}$ in. diam.; tunics brown, membranous. Leaves generally 3, ensiform, about a foot long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, laxly ribbed. Stem 1 $\frac{1}{2}$ -2 ft. long. Spike lax, many-flowered, 6-9 in. long; outer spathe-valve lanceolate, 1-1 $\frac{1}{2}$ in. long. Perianth-tube slightly curved, $\frac{1}{3}$ - $\frac{1}{2}$ in. long; segments dark purple, 1-1 $\frac{1}{4}$ in. long, about equal in length; 3 upper slightly imbricated in fully expanded flower, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; 3 lower with a claw as long as the blade, and a white line down the centre. Anthers $\frac{1}{2}$ in. long, exceeding the filaments. Capsule turbinate, $\frac{1}{2}$ in. long. Seeds turgid, with a distinct membranous wing.

G. cardinalis (Curt. Bot. Mag. t. 135); corm large, globose; stem 3-4 ft. long; produced leaves 4-6, ensiform, rather thin in texture, glaucous green, reaching 2 ft. or more in length, $\frac{3}{4}$ -1 in. broad; flowers 12-20 in a spike $\frac{1}{2}$ -1 ft. long, all more or less ascending; spathe-valves green, thin in texture, lanceolate, acute, $1\frac{1}{2}$ -3 in. long; perianth bright scarlet; tube nearly straight, $1\frac{1}{2}$ in. long, funnel-shaped in the upper half; upper segments oblong-spathulate, acute, concolorous, 2 in. long, $\frac{3}{4}$ -1 in. broad; 3 lower shorter and narrower, conspicuously mottled with white at the throat; stamens reaching more than halfway up the limb; anthers lanceolate, $\frac{1}{3}$ the length of the filaments. *Schneev. Ic. t. 27; Red. Lil. t. 112; Ker, Gen. Irid. 143; Baker, Handb. Irid. 219. G. speciosus, Eckl. Top. Verz. 41, non Thunb.*

G. communis Linn. Sp. Plant. 52, ex parte; Curt. in Bot. Mag. t. 86; Ker in Bot. Mag. t. 1575; Red. Lil. t. 267; Reich. Ic. Crit. tab. 598; Fl. Germ. tab. 349, fig. 777. [Description from Baker, 1892.] — Corm $\frac{3}{4}$ in. diam.; tunics of matted parallel fibres, reticulated upwards. Leaves 3-4, ensiform, $\frac{1}{2}$ -1 ft. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, laxly nerved. Spike lax, secund, 4-8-flowered; outer spathe-valve green, an inch long. Perianth-tube curved, funnel-shaped, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; segments bright purple, an inch long, about equal in length, all connivent when fully expanded; 3 lower with a long claw and white central line. Anthers $\frac{1}{3}$ in. long, equalling the filaments. Capsule turbinate, $\frac{1}{2}$ in. long. Seeds broadly winged.

G. cruentus (Moore in Gard. Chron. 1868, 1138); corm large, globose; stem 2-3 ft. long; produced leaves about 4, ensiform, dark glaucous green, $1\frac{1}{2}$ -2 ft. long, $\frac{3}{4}$ -1 in. broad; spike rather dense, distichous, 6-10-flowered; bracts very large, lanceolate, the lower sometimes 3-6 in. long; perianth bright scarlet; tube $1\frac{1}{2}$ -2 in. long, nearly straight, funnel-shaped in the upper half; upper segments concolorous, obovate-spathulate, obscurely cuspidate, 2-2 $\frac{1}{2}$ in. long, $1\frac{1}{4}$ - $1\frac{1}{2}$ in. broad; 3 lower about $1\frac{1}{2}$ in. long, 1 in. broad, with a large white blotch at the throat with small red spots; anthers lanceolate, reaching halfway up the limb. *Hook. fil. in Bot. Mag. t. 5810; Baker, Hand. Irid. 219.*

G. cuspidatus (Jacq. Ic. t. 257); corm globose; tunics of fine, parallel strands of matted fibres; stems simple, 2-3 ft. long; leaves 3-4, linear, rigid in texture, glabrous, the lowest $1\frac{1}{2}$ -2 ft. long, about $\frac{1}{2}$ in. broad; flowers 4-8, in a lax second spike; spathe-valves green, lanceolate, outer 2-3 in. long; perianth white or pale pink; tube slightly curved, 2-3 in. long, clavate in the upper third; segments oblong, $1\frac{1}{2}$ in. long, $\frac{1}{3}$ - $\frac{1}{2}$ in. broad, narrowed into a long, wavy point, the three lower with a spade-shaped purple blotch; stamens reaching halfway up the limb. *Ker in Bot. Mag. t. 582; Gen. Irid. 139; Andr. Bot. Rep. t. 219; Red. Lil. t. 136; Baker, Handb. Irid. 205. G. undulatus, Linn. Mant. 27; Thunb. Fl. Cap. i. 206, ex parte. G. affinis, Pers. Syn. i. 45.*

VAR. β , *G. ventricosus* (Lam. Encyc. ii. 727); flowers pink; point of the segments shorter and less wavy. *G. cuspidatus, Andr. Bot. Rep. t. 147; Red. Lil. t. 36. G. carneus, Jacq. Ic. t. 255; Ker in Bot. Mag. t. 591, non Delaroché.*

VAR. γ , *ensifolius* (Baker); whole plant under a foot long; leaves short, rigid, ensiform

G. dracocephalus (Hook. fil. in Bot. Mag. t. 5884); corm large, depresso-globose. stem simple, about 2 ft. long; produced leaves ensiform, $1\frac{1}{2}$ ft. long, $\frac{3}{4}$ -1 in. broad, moderately firm in texture; flowers few, arranged in a very lax second spike; outer spathe-valve lanceolate, green, 2-3 in. long; perianth-tube much-curved, greenish, $1\frac{1}{2}$ -2 in. long; limb $1\frac{1}{2}$ in. long, yellowish-green, minutely grained and spotted with dull purple; upper segments obovate, permanently hooded, $\frac{3}{4}$ -1 in. broad; lower lanceolate, reflexing; stamens reaching near to the top of the segments; anthers lanceolate, less than half as long as the filaments. *Baker in Journ. Linn. Soc. xvi. 176; Handb. Irid. 220.*

G. floribundus (Jacq. Ic. t. 254); corm globose; tunics of matted fibres; produced leaves 3-4, ensiform, 1-2 ft. long; stems $1\frac{1}{2}$ -2 ft. or more long including the inflorescence, branched when at all luxuriant; flowers white with a pink tinge, 4-12 in a very lax distichous spike, all ascending; outer spathe-valve oblong-lanceolate, $1\frac{1}{2}$ -2 in. long; perianth-tube nearly straight, $1\frac{1}{2}$ -2 in. long, funnel-shaped in the upper third; segments as long as the tube, obovate-spathulate, deltoid at the tip, the upper $\frac{3}{4}$ -1 in. broad; stamens reaching $\frac{1}{3}$ or $\frac{1}{2}$ -way up the limb. *Ker in Bot. Mag. t. 610; Gen. Irid. 143; Baker Handb. Irid. 218. G. grandiflorus, Andr. Bot. Rep., t. 118.*

G. grandis (Thunb. Fl. Cap. i. 186); corm globose; tunics of thick, parallel wiry fibres; stem slender, terete, 1-2 ft. long; leaves 3, superposed, terete, strongly ribbed, firm in texture, the lowest 1-1½ ft. long; flowers fragrant; 2-6 in a very lax secund spike; spathe-valves green, lanceolate, the outer 2-2½ in. long; perianth 2½-3 in. long, with a curved tube funnel-shaped in the upper third; segments yellowish-white, more or less tinged with purplish-brown, especially on the keel, oblong, ½-¾ in. broad, narrowed into a long point; stamens reaching halfway up the limb; capsule oblong, membranous, 1½ in. long. *Klatt in Linnæa* xxxii. 714; *Baker, Handb. Irid.* 202. *G. tristis*, Linn. herb.! *G. tristis*, var. *grandis*, Thunb. Diss. No. 8. *G. versicolor*, Andr. Bot. Rep. t. 19; Ker in Bot. Mag. t. 1042; *Gen. Irid.* 135.

G. hirsutus Jacq. Ic. t. 250; Red. Lil. t. 278. [Description from Baker, 1892.] *G. roseus* Andr. Bot. Rep. t. 11. *G. hirsutus* var. *roseus* Ker in Bot. Mag. t. 574.—Corm middle-sized, globose, crowned with a ring of bristles. Leaves 4-5, superposed, ensiform, strongly ribbed, both the sheath and short blade finely hairy. Stem 1-1½ ft. long. Flowers 3-6 in a very lax secund spike; spathe-valves lanceolate, green, lower outer 1½-2 in. long. Perianth bright red, with a curved tube 1½ in. long; segments obovate, cuspidate, as long as the tube, the upper ¾ in., the lower ½ in. broad. Stamens more than half as long as the segments.

G. oppositiflorus (Herb. in Bot. Reg. 1842, Misc. 86); corm large, globose; tunics of matted fibres; produced basal leaves about 4, ensiform, firm in texture, 1-1½ ft. long, ¾-1 in. broad; stem 3-4 ft. long including the inflorescence, often branched; flowers up to 30 or 40, arranged in a distichous spike often a foot



FIG. 6. GLADIOLUS PAPILIO

long; spathe-valves green, lanceolate, acute, thin in texture, $1-1\frac{1}{2}$ in. long; perianth white; tube curved, $1-1\frac{1}{4}$ in. long, slender up to the top; limb horizontal, $1\frac{1}{2}$ in. long, with oblong-spathulate acute segments not more than $\frac{3}{4}-\frac{1}{2}$ in. broad at the middle; stamens half as long as the limb. *Baker, Handb. Irid.* 218; *Bot. Mag. t.* 7292.

G. Papilio (Hook. fil. in *Bot. Mag. t.* 5565); corm middle-sized, globose; tunics of parallel strands of fine matted fibres; produced subbasal leaves about 4, ensiform, glabrous, rigid in texture, $1-1\frac{1}{2}$ ft. long, $\frac{3}{4}-1$ in. broad at the middle; stem 2-3 ft. long including the inflorescence; flowers pale purple, 6-12 in a lax spike; spathe-valves oblong-navicular, cuspidate, the outer $1-1\frac{1}{2}$ in. long; perianth horizontal; tube curved, $\frac{1}{4}$ in. long, broadly funnel-shaped in the upper half; limb $1\frac{1}{4}-1\frac{1}{2}$ in. long; 3 upper segments obovate-spathulate, $\frac{1}{2}-\frac{3}{4}$ in. broad, upper not reflexing; 3 lower oblong-unguiculate, with a large reddish spade-shaped blotch edged with yellow at the throat; stamens reaching halfway up the limb. *Baker in Journ. Linn. Soc. xvi.* 175; *Handb. Irid.* 216.

G. primulinus Baker in *Gard. Chron.* 1890, ii. 122. [Description from Baker, 1892.] — Corm large, globose. Basal leaves 3, ensiform, subcoriaceous, strongly ribbed, the lowest a foot long, $\frac{3}{4}$ in. broad. Stem $1\frac{1}{2}$ ft. long, the upper short and adpressed. Spike lax, secund, 4-5-flowered; spathe-valves lanceolate, green, $1-1\frac{1}{2}$ in. long. Perianth uniform primrose-yellow; tube much curved, an inch long; upper segments obtuse, much imbricated, $1\frac{1}{4}$ in. long; 3 lower smaller. Stamens reaching halfway up the segments.

G. psittacinus (Hook. in *Bot. Mag. t.* 3032); corm very large, depresso-globose; tunics of parallel strands of matted fibres; produced leaves about 4, ensiform, rigid in texture, 1-2 ft. long, 1-2 in. broad; stem 3-4 ft. long including the inflorescence; spike very lax, reaching a foot or more in length; spathe-valves green, oblong-lanceolate, 2-3 in. long; perianth-tube curved, $1\frac{1}{2}-2$ in. long, sub-cylindrical in the upper half; limb about equalling the tube; upper segments obovate, dark crimson, hooded, $\frac{3}{4}-1$ in. broad; lower segments much smaller, reflexing at the top, red and yellow mixed, stamens reaching nearly to the tip of the segments; anthers $\frac{1}{2}$ in. long; filaments about $1\frac{1}{2}$ in. long; capsule large, oblong. *Bot. Reg. t.* 1442; *Reich. Exot. t.* 116; *Baker, Handb. Irid.* 220. *G. natalensis*, *Reinw. ex Hook. in Bot. Mag. sub t.* 3084; *Sweet, Brit. Flow. Gard. ser. 2, t.* 281; *Lodd. Bot. Cab. t.* 1756. *Watsonia natalensis* *Eckl. Top. Verz.* 34.

VAR. β G. Cooperi (Baker in *Bot. Mag. t.* 6202); perianth-tube $2\frac{1}{2}-3$ in. long; segments more acute.

G. purpureo-auratus (Hook. fil. in *Bot. Mag. t.* 5944); corm large, globose; tunics of parallel strands of matted fibres; leaves ensiform, glabrous, rigid in texture, much shorter than the stem; stem 3 ft. long including the inflorescence; flowers 10-15 in a lax secund spike a foot long; spathe-valves green, oblong-lanceolate, $1-1\frac{1}{2}$ in. long; perianth primrose-yellow; tube much curved, funnel-shaped, under an inch long; upper segments plain, obovate-spathulate, $1\frac{1}{4}-1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. broad; lower obovate-unguiculate, the two inner with a spade-shaped red-brown blotch at the throat; stamens reaching halfway up the limb. *Baker in Journ. Linn. Soc. xvi.* 175; *Handb. Irid.* 216.

G. recurvus (Linn. Mant. 28); corm globose, $\frac{3}{4}-1$ in. diam.; tunics of parallel wiry fibres; stems slender, simple, 1-2 ft. long; leaves 3, firm in texture, terete, strongly ribbed, the lowest about a foot long; flowers very fragrant, 2-6, in a very lax secund spike; outer spathe-valve green, lanceolate, $1\frac{1}{2}-2$ in. long; perianth-tube curved, $1\frac{1}{2}-2$ in. long, clavate in the upper third; limb $1-1\frac{1}{4}$ in. long, yellowish-white, much flushed with dark lilac; segments oblong, acute, $\frac{1}{2}$ in. broad; stamens reaching more than halfway up the limb; capsule oblong, membranous, $1-1\frac{1}{4}$ in. long. *Ker in Bot. Mag. t.* 578, non *Thunb.*; *Baker, Handb. Irid.* 203. *G. punctatus*, *Jacq. Ic. t.* 247. *G. tristis*, var. *punctatus*, *Thunb. Diss. No. 8.* *G. carinatus*, *Ait. Hort. Kew. i.* 64. *G. ringens*, *Andr. Bot. Rep. tt.* 27 and 227; *Red. Lil. t.* 123. *G. odoratus*, *Salisb. Prodr.* 40. *G. violaceus*, *Pers. Syn. i.* 43. *Watsonia recurva*, *Pers. Syn. i.* 43. *G. breynianus*, *Ker, Gen. Irid.* 135. *G. maculatus*, *Sweet, Hort. Brit. edit. 1,* 397; *Klatt in Linnæa xxxii.* 708.

G. Saundersii (Hook. fil. in *Bot. Mag. t.* 5873); corm large, depresso-globose; produced leaves 4-6, ensiform, rigid in texture, strongly ribbed, 1-2 ft. long, $\frac{3}{4}-1$ in. broad; stem 2-3 ft. long including inflorescence; spike very lax, $\frac{1}{2}$ ft. long, 6-8-flowered; spathe-valves green, lanceolate, $1\frac{1}{2}-2$ in. long; perianth-tube curved, $1-1\frac{1}{2}$ in. long, broadly funnel-shaped in the upper half; limb bright scarlet; 3 upper segments concolorous, oblong-spathulate, acute, an inch broad; 3 lower shorter, $\frac{1}{2}$ in. broad, with a great

blotch of white spotted with scarlet at the throat; stamens reaching nearly to the tip of the segments; anthers $\frac{1}{2}$ in. long, half the length of the filaments. (Baker in Journ. Linn. Soc. xvi. 176; *Handb. Irid.* 220.)

G. segetum Ker in Bot. Mag. t. 719; Reich. Ic. Crit. t. 600; Fl. Germ. tab. 353, fig 781. [Description from Baker, 1892.] *G. communis* Linn. ex parte; Sibth. & Sm. Fl. Græc. t. 37. *G. infestus* Biane. *G. italicus* Gaud. *G. inarimensis* Guss. *G. Ludovicæ* Jan. *G. caucasicus* Herb. *Sphærospora imbricata* Sweet.—Corm globose, $\frac{3}{4}$ –1 in. diam.; tunics of matted parallel fibres, reticulated upwards. Produced leaves 3–4, ensiform, 1–1 $\frac{1}{2}$ ft. long, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, laxly unequally nerved. Stem 1–1 $\frac{1}{2}$ ft. long. Spike lax, 6–10-flowered; outer spathe-valve green, lanceolate, 1–1 $\frac{1}{2}$ in. long. Perianth-tube curved, $\frac{1}{4}$ – $\frac{1}{2}$ in. long; segments 1–1 $\frac{1}{2}$ in. long, bright purple, obovate, obtuse; the upper $\frac{1}{2}$ in. broad, with a short claw; the lateral shorter; the 3 lower as long, with a long narrow claw and white line down the keel. Anthers $\frac{1}{2}$ in. long, exceeding the filaments. Capsule turbinate, $\frac{1}{2}$ in. long, torulose when mature. Seeds brown, globose.

G. sericero-villosus (Hook. in Bot. Mag. t. 5427); corm large, globose; leaves about 6 in a subbasal distichous rosette, ensiform, glabrous, strongly ribbed, 1 $\frac{1}{2}$ –2 ft. long, $\frac{1}{2}$ –1 in. broad; stem 3–4 ft. long including the inflorescence, clothed throughout with soft, crisped, white, spreading hairs; spike distichous, 20–30-flowered, with a flexuose, densely villose axis; outer spathe-valve oblong-lanceolate, villose, scarious in the upper half; flower bright yellow; perianth-tube curved, funnel-shaped, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; limb rather longer than the tube; upper segments oblong-spathulate, $\frac{1}{4}$ in. broad; lower narrower, unguiculate; stamens reaching halfway up the limb. *Baker, Handb. Irid.* 215.

G. tristis (Linn. Sp. Plant. edit. 2, i. 53, ex parte); corm globose, 1 in. diam.; tunics of fine parallel strands of matted fibres; stems slender, simple, 1–2 ft. long; leaves 3, superposed, terete, with 3–5 much-raised, stramineous ribs, the lower 1–1 $\frac{1}{2}$ ft. long; flowers 3–4 in a very lax secund spike, fragrant; spathe-valves green, lanceolate, 1 $\frac{1}{2}$ –2 in. long; perianth-tube curved, 1 $\frac{1}{2}$ –2 in. long, funnel-shaped in the upper third; limb yellowish-white, slightly flushed on the keel of the segments with purplish-black; segments oblong-spathulate, acute, $\frac{1}{3}$ – $\frac{1}{2}$ in. broad; stamens more than half as long as the perianth-limb; capsule oblong, membranous, an inch long. *Thumb. Diss. No. 8, ex parte; Curt. in Bot. Mag. t. 272; Jacq. Ic. t. 243; Ker in Bot. Mag. t. 1098; Gen. Irid.* 136; *Baker, Handb. Irid.* 203. *G. spiralis*, Pers. Syn. i. 43; *Red. Lil. t. 35.*

VAR. β , G. concolor (Salisb. Parad. t. 8); flowers almost concolorous, and a purer white than in the type. *G. tristis*, *Jacq. Ic. t. 245.*

EVOLUTION OF THE GLADIOLUS

There are fifteen species of Gladiolus in Europe, Asia Minor, and Persia. These are, according to Baker: *atroviolaceus* Boiss.; *byzantinus* Miller; *communis* Linn.; *halophilus* Boiss.; *humilis* Stapf; *illyricus* Koch; *imbricatus* Linn.; *Kotschyanus* Boiss.; *micranthus* Stapf; *palustris* Gaud.; *persicus* Boiss.; *segetum* Ker; *sintensii* Baker; *tricolor* Stapf; *triphyllus* Sibth. Only a few of these have been cultivated; *G. communis* and *G. segetum*, however, have been cultivated for several centuries. It is not improbable that the Greeks and the Romans used the flowers of native species, gathered from their grain-fields,⁶ in their floral decorations. The plant may even have been cultivated by these peoples.⁷ However this may be, there is no definite record of the time when the plant came into cultivation. The two species just named either grew in Britain or were taken there in early times, and, according to Gerarde (1597), were important garden plants. *G. byzantinus*, the Constantinople corn flag, was introduced prior to 1629.

⁶ Dioscorides says that a purple-flowered gladiolus (probably *G. communis*) grew mostly in cultivated grounds.

⁷ Athenæus says gladiolus was planted on the graves of virgins.

An idea of the garden gladioli of three centuries ago may be obtained from *Hortus Eystettensis* (Besler, 1613), in which six colored figures of gladiolus appear. These are as follows:



Gladiolus Narbonensis
flore purpureo

Gladiolus sylvestris

FROM HORTUS EYSTETTENSIS, 1613
Gladiolus Narbonensis
flore incarnato

FIG. 7. GARDEN GLADIOLI THREE CENTURIES AGO

- Folio 10 II. *Gladiolus sylvestris* Cordi (*Victorialis rotunda*).
Runde Sigwurz mit rother blumen.
A small slender plant bearing three flowers on the spike.
- III. *Gladiolus Narbonensis flore purpureo*.
Schwertelbrauner.
A spike bearing nine flowers is shown.

IV. *Gladiolus Narbonensis flore incarnato*.
Leibsarb Schwertel.

A spike bearing six flowers is shown.

Folio 12 I. *Gladiolus Italicus flore rubro*.

Roth Welsch Schwertlilien.

A five-flowered spike is shown.



FROM HORTUS EYSTETTENSIS, 1613

Gladiolus Hispanicus
flore albo

Gladiolus Italicus
flore rubro

Gladiolus Narbonensis flore in-
carinato, intensiore, seu magis
roseo

FIG. 8. GARDEN GLADIOLI THREE CENTURIES AGO

II. *Gladiolus Hispanicus flore albo*.

Weiss Spanisch Schwertlilien.

A seven-flowered spike is shown.

III. *Gladiolus Narbonensis flore incarnato, intensiore, seu magis roseo*.

Leibsarb Narbonische Schwertlilien.

The flowers shown in folio 10 appear to belong to different species. Ker identifies Figure 11 with *G. imbricatus* Linn. and Figures 111 and 14 with *G. communis* Linn. The plants shown in Figures 11 and 111 of folio 12 are probably of the same species, possibly *G. segetum*, while Figure 1 belongs to a second-flowered species.

Ray (1686-1704) writes of the corn flag as of no great esteem, and only consents to admit the plant to the flower garden because the flowers bloom at a season — in June and July — when there are not many other flowers. He mentions *Gladiolus byzantinus*, *G. flore suave rubente*, and *G. flore alba*, and names three other commoner varieties — two French corn flags, one with ash-colored and the other with red flowers, and the Italian corn flag “that beareth saddei red flowers on both sides of the stalks.” He says further that *G. byzantinus* is somewhat tender and should be protected, but the others are hardier.

Miller (1731) describes the following species:

1. *Gladiolus utrinque floridus*. C. B. P.⁸ Cornflag with Flowers on both Sides the Stalks.
2. *Gladiolus carnei coloris*. Swert. Flor.⁹ Flesh-colour'd Cornflag.
3. *Gladiolus floribus uno versu dispositis, major, floris colore purpureo-rubente*. C. B. P. Great Cornflag, with reddish-purple Flowers rang'd on one Side the Stalk.
4. *Gladiolus major Byzantinus*. C. B. P. Great Cornflag of Constantinople.
5. *Gladiolus utrinque floridus, floribus albis*. H. R. Mons.¹⁰ Cornflag with white Flowers rang'd on each side the Stalk.
6. *Gladiolus maximus Indicus*. C. B. P. The largest Indian Cornflag.

In a later edition (1754) he adds the following:

7. *Gladiolus floribus uno versu dispositis, major and procerior, flore candicante*. C. B. P. Greater and taller Cornflag, with whitish Flowers rang'd all on one Side.
8. *Gladiolus floribus uno versu dispositis, minor and humilior*. C. B. P. Smaller and lower Cornflag, with Flowers ranged on one Side.
9. *Gladiolus minor, floribus uno versu dispositis incarnatis*. H. L. Smaller Cornflag, with flesh-coloured Flowers ranged on one Side.
10. *Gladiolus utrinque floridus, flore rubro*. C. B. P. Cornflag with red Flowers on both Sides.
11. *Gladiolus floribus uno versu dispositis, minor*. C. B. P. Smaller Cornflag, with Flowers ranged on one Side.

It is probable that among the latter species nos. 7, 8, 9, and 11 are varieties of no. 3, and that nos. 5 and 10 are varieties of no. 1. Miller says that all these sorts of corn flag are

propagated by their tuberose Roots, which the first, second, and fifth Sorts produce in great Plenty; so that in a few Years, if they are suffer'd to remain unremov'd, they will spread very far, and are hardly to be intirely rooted out, when they have once gotten Possession of the Ground. . . . These roots may be taken up in July, when their Leaves decay, and may be kept out of the Ground until October.

⁸ C. B. P. = Casper Bauhin's *Pinax*.

⁹ Swert. Flor. = Swertius' *Florilegium*.

¹⁰ H. R. Mons. = Catalogue of Royal Garden at Montpellier.

The third and fourth Sorts are the most valuable, producing taller Stalks, and fairer Flowers; nor are these so apt to increase; which renders them fitter for the Borders of a Flower-garden; so that since these have been introduced, and become common, the other Sorts have been rejected, unless in some old Gardens, or for large Wilderness-quarters, where they will grow better than the two last-mentioned.

The Indian Cornflag is tender, and must be preserved in a warm Green-house, or a moderate Stove, during the Winter-season. These Roots should be planted in pots filled with a light sandy soil. The best time to transplant them is any time from May till September.

A study of these species — *G. communis*, *G. segetum*, and *G. byzantinus* — leads to the conviction that the greatest possible advance had been made as early as the time of Parkinson. No further improvement in garden gladioli was made for about one hundred and fifty years, when other species were introduced.

It is not definitely known which of the African species from the Cape of Good Hope was first introduced into Europe. The evidence points to *G. angustus* and *G. tristis*, since they are mentioned by Breyne (1739 b) and the former was figured by Linnæus in *Hortus Cliffortianus* (1737). *G. tristis* was flowered by Miller in 1745, and *G. alatus* and *G. recurvus* (the latter under the name *Breynianus*) were also, according to Ker, known to Breyne. These were followed by *G. Milleri*, 1751, *G. involutus*, 1757, and *G. undulatus*, 1760.

Soon a great many irids from the Cape were described under the genus *Gladiolus*, but later a large proportion, if not the majority, of these were transferred to new genera. This, together with the confusion concerning the identity of the species, makes it quite impossible to fix with certainty the date of introduction of these older forms. For example, Lamarck's *Encyclopedia* (1786) describes thirty-two species, of which only eight — *alatus* Linn., *angustus* Linn., *communis* Linn., *imbricatus* Linn., *luteus* Lam., *montanus* Linn., *recurvus* Linn., and *tristis* Linn. — are now recognized as true species of *Gladiolus*, most of the others being now included in *Babiana* and *Watsonia*.

G. blandus was introduced in 1774, *G. cardinalis* and *G. floribundus* in 1789. These species gave the first impetus to gladiolus improvement.

The attention of amateurs and gardeners appears to have been directed toward the early-flowering species, which yield flowers during the early summer when planted in the fall. This was possible because many of the species were fairly hardy in England and the Low Countries. Such species as *cardinalis*, *communis*, *blandus*, and *tristis* were especially adapted for garden planting. The plants seeded freely, and since cross-fertilization is easily accomplished in gladioli it is not surprising to find a number of new forms soon appearing in the gardens.

The first important hybrid appears to have been *G. Colvillei*, or Colville's corn flag, which was raised in 1823 at Colville's Nursery, Chelsea, England,

from seeds of *G. concolor* fertilized by the pollen of *G. cardinalis*. *G. concolor* is now regarded by botanists as a variety of *G. tristis*. The flowers were bright scarlet, with lanceolate blotches of white on the three lower segments. The flowers were fragrant, which points to *G. tristis* as one of the parents. This hybrid is still in the market and is, at least in America, the most important variety for growing under glass.

Although the production of *G. Colvillei* was the first important achievement in the improvement of gladioli, it was not the result of the first effort in this field. The earliest attempts to hybridize gladioli appear to have been made by the Honorable William Herbert, Dean of Manchester, early in the last century. In 1818 he wrote the Horticultural Society of London as follows (Herbert, 1820:196):

Having raised two beautiful and hardy species of Gladiolus, by impregnating *Cardinalis* with *Blandus* and *Blandus* with *Cardinalis*, I propose to call one *Gladiolus Blando-Cardinalis*, and the other *Gladiolus Cardinali-Blandus*. These two new species of *Gladiolus* which have flowered make seed freely. I have also mules from *Gladiolus tristis* impregnated by the large flowering blue *Gladiolus recurvus*.

Later, in 1819, in his classic paper *On the Production of Hybrid Vegetables* (Herbert, 1822a:44-45), he wrote:

Of Gladioli I possess the following mules: *G. blando-cardinalis*, *G. cardinali-blandus*, *G. angusto-blandus*, *G. tristi-blandus*, *G. floribundo-blandus*; *G. cardinali-angusto-blandus*; *G. tristi-hirsutus*; *G. rinngenti-tristis*, and *G. versicolore-hirsutus*. I have this year seeds from further intermixtures, and mules may probably be obtained with endless variety of colour. These mules flower most beautifully in the open border, in a mixture of sand and peat, in patches amongst the Azaleas. It is perhaps best to take up the bulbs, and dry them, when the seed is ripe; but I have left African Gladioli unmoved for several years, in the border. I have never seen the least approximation to each other in the natural seedlings of *G. blandus*, *G. tristis*, *G. cardinalis*, *G. hirsutus*, and *G. recurvus*.

Dean Herbert was an enthusiastic cultivator of gladioli, as well as an authority on the Cape bulbs. The following prophecy, written in 1820 (Herbert, 1822b), will be of interest to all lovers of gladioli:

I am persuaded that the African Gladioli will become great favorites with florists, when their beauty in the open border, the facility of their culture, and the endless variety which may be produced from seed by blending the several species, are fully known, nor will they be found to yield in beauty to the Tulip and Ranunculus.

In 1837 he wrote as follows:

The hybrid Gladioli, of which a large portion are sufficiently hardy, flower about the same time as the roses. These hardy crosses are between *G. Cardinalis*, *blandus*, *carneus*, *inflatus*, *angustus*, and *tristis*, and they vary with every shade of colour from white to scarlet, rose, coppery, and blackish purple, and some are exquisitely speckled in consequence of the cross with *tristis*. The beautiful crosses with *hirsutus*, *recurvus*, and *versicolor* are more delicate plants, and do not succeed well in the border.

Ten years later, in the *Journal of the Horticultural Society of London*, he wrote (Herbert, 1847):

Forty years ago I first crossed the large and brilliant scarlet and white *Gladiolus cardinalis* with the smaller, but more freely flowering, *G. blandus*, which sports with

white, purple, and rose coloured flowers, and (under the name of *carneus*, which was in truth rather a local variety of the same) of a coppery flesh-colour. The result was a fertile breed of great beauty, of which the prevailing colour was purplish roseate. Crossed again with *cardinalis* it yielded florid plants, scarlet, copper-coloured, rose-coloured, white, and purple with endless variation. By a cross of the first mule and of *cardinalis* itself with *G. tristis*, of which the flower is pale yellow with brown specks, deeper tints and rich speckling were introduced, with a difference in the foliage and seeds, the seed of *G. tristis* being smaller and longer, its leaves rigid and quadrangular, the transverse section exhibiting a cross. The seeds of *cardinalis* are like those of *blandus*, but larger. There can scarcely be two species more dissimilar than *cardinalis* and *tristis* in any genus which has the form of the perianth uniform, the latter having such remarkable leaves, narrow, rigid, and erect, a slender stem, with night-smelling flowers, and the former very broad semi-recumbent glaucous foliage, and an inclined half-recumbent stem with large scarlet and white blossom; yet the produce of these intermixed is fertile, and where the third species *blandus* has been also admitted into the union, it is fertile in the extreme (incomparably more so than the pure *G. cardinalis*), and by that triple cross the tall strong *Gladiolus oppositiflorus* of Madagascar has also produced offspring, which, though not disposed at present to make seed freely, has produced some this year. Again, the first of these mules was fertilized by *G. hirsutus* (known at the Cape by the name *roseus*), a plant with flowers straighter than usual in the genus, and strongly scented, the leaves hairy and margined with red. That cross has not as yet proved fertile. The same *G. hirsutus* was crossed by Mr. Bidwell at Sydney, where the Cape bulbs thrive more freely than here, with *G. alatus* (which Ecklon wished to turn off into a genus *Hebea*), having hard rigidly ribbed leaves, a short stem, and orange flowers. The cross-bred plants flowered here last autumn, being intermediate in foliage and flower. The only opportunity I have had of crossing *G. alatus* with the first-named mules was defeated, notwithstanding much precaution, through the introduction of pollen by the humblebees, which are dangerous marplots to such experiments.

The second important hybrid was *G. ramosus*, which, according to the *Revue Horticole* for 1838, was obtained at Haarlem from seed of *G. blandus*, or "*floribunda*." It was first flowered in France by M. Rifkogel in 1838. Meanwhile (in 1835) it had been introduced into England and a figure of it was published in *Paxton's Magazine of Botany* (volume 6 [1839], pages 99 and 100). The flower was openly funnel-shaped, bright red with deep blotches at the base of the three lower segments, and resembled *G. blandus*. The plant was tall, with heavy, broad leaves. Although it was not entirely hardy, requiring a heavy mulch for protection, it was necessary to plant it in the fall in order to get results. Nevertheless the varieties of this type, owing to the fact that they flowered later than those of *G. blandus* and *G. cardinalis*, formed an important group for at least the next twenty years and have not yet entirely disappeared from European lists.

A number of hybrids were obtained by crossing *G. floribundus* and *G. ramosus*. Some of these, figured by color plates in works of the time, were *Triomphe de Louvain* (Carolus, 1845), *Countess Coghén* and *Madame de Vilain* (Rosseels, 1847), *Leopoldii* (Carolus, 1848); and *Mademoiselle Sosthenie* (Truffaut fils, 1848).

Up to 1840, in spite of the efforts to improve the gladiolus and notwithstanding the amount of variation that had resulted from these efforts, the plant remained little more than a plant for the attention of interested

amateurs. Before that time it does not appear to have received general attention or to have been an important plant in the seed or nursery trade.

In the following table the names of varieties of gladioli are given, with their prices, as taken from advertisements of Messrs. T. & C. Lockhart, 156 Cheapside, London. The table shows the varieties cultivated in England prior to the introduction of *G. gandavensis*.

Species or variety	Year					
	1837	1838	1839	1840	1841	1842
	Per dozen	Per dozen	Per dozen	Per dozen	Per dozen	Each
	s. d.	s. d.	s. d.		s. d.	s. d.
albus.....	4-0	4-0	4-0	.....	1-0	.....
byzantinus.....	2-0	3-0	3-0	.....	2-6	0-2
cardinalis inflatus.....	5-0	6-0	5-0	.....	6-0	0-6
psittacinus.....	3-0	.....	2-6	.....	2-0	0-3
	Each	Each	Each	Each	Each	Each
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Colvillei.....	.....	.....	.....	2-0	2-0	1-0
floribundus.....	1-4	1-0	.....	.....	0-6	1-0
salicatus.....	.....	1-0	2-6	2-0	2-6	1-6
Herbertii.....	.....	.....	.....	2-0	3-6	2-0
hirsutus.....	.....	2-6	2-6	.....	2-6	.....
inflatus blandus.....	.....	.....	.....	.....	.....	1-6
insignis.....	.....	.....	.....	15-0	15-0	10-0
Loddigesii.....	.....	.....	.....	5-0	5-0	3-6
praecox.....	.....	1-0	2-6	.....	2-6	1-0
roseus.....	.....	1-0	2-6	.....	2-6	1-6
tristis.....	.....	1-0	1-6	.....	1-6	1-0
trimaculatus.....	.....	1-0	2-6	2-0	2-6	1-0
ramosus.....	.....	20-0	15-0	12-6	5-0	5-0

At this time came the real starting point of the modern garden gladiolus, in *G. gandavensis*, sent out by Louis van Houtte in 1841. This gladiolus originated with M. Beddinghaus, gardener to the Duc d'Arenberg, who decided to produce hybrids between *G. psittacinus*, *G. floribundus*, *G. ramosus*, and *G. cardinalis*, all of them tall, showy species. He obtained seed in 1837, and in 1839 and 1840 he exhibited his seedlings in flower at Enghien. A seedling, a hybrid between *G. psittacinus* (*G. natalensis* Reinw.) and *G. cardinalis*, was admired by those who saw it. M. Van Houtte purchased it and introduced it through the medium of his catalog. Later he published a color plate of it in his *Flore des Serres*, with the following description by Lemaire (1846 b): "Le *Gladiolus grandavensis* a le port et l'inflorescence du *G. natalensis*, mais dans des proportions plus grandes, le coloris du *G. cardinalis*, mais plus riche et plus varié."

This hybrid created a furor in the gladiolus world, and the interest in the plant steadily grew after this form was introduced. It was soon followed by *G. gandavensis* var. *citrinus*, a citron-yellow flower having a red stripe down the middle of each of the three lower segments.

Dean Herbert, who at this time had had long experience in hybridizing gladioli, doubted the parentage of *G. gandavensis* as given by M. Van Houtte. He said (1837:365): "I have not succeeded in obtaining any cross, on the correctness of which I can depend, by admixture with *Gladiolus psittacinus* (Nathalensis), and I do not believe that it will breed with any of the above" (referring to *G. cardinalis*, *blandus*, *carneus*, *inflatus*, *angustus*, *tristis*, *hirsutus*, *recurvus*, and *versicolor*).

It appears that in the discussions of the time *G. floribundus* was confused, at least in commercial circles, with *G. oppositiflorus* — a not unnatural result when it is considered that the true plants are closely allied botanically. Both are allied to *G. blandus*. The flowers of the two first named are white or only tinged with pink; and considering the number of flowers produced on a spike, it is reasonable to suppose that these species would be used in crossing. In fact there is evidence of *G. floribundus* having been used. Among the first of its hybrids were those of Mr. Cole, gardener for Mr. Willmore at Oldford, England, who sent out the following varieties in 1850:

Willmoreanus, a hybrid between *G. gandavensis* and *G. floribundus*, creamy white, the three upper divisions streaked delicate rosy purple.

Oldfordiensis, delicate salmon color marked with purple. Flowers large.

Roseo-purpureus, deep rosy red, marked with deep purple-red. Flowers of medium size. Two years later Wellington, a deep orange-red variety, was sent out from the same source.

The record is not clear as to *G. oppositiflorus* unless the plant used by Mr. Cole was really this species. However one may regard the statements concerning the origin of *G. gandavensis*, there is no escaping the conclusion, after studying present-day varieties of this group, that *G. oppositiflorus* either was one of the parents of the original hybrid or has been used in hybridizing with it. Without herbarium specimens of the first varieties of *gandavensis*, it is of course difficult to determine whether they exhibit any characteristics of *G. oppositiflorus*. On examination of the colored figures of this form, it would seem as though the distichous arrangement of the flowers on the spike was apparent from the beginning. Paxton (1844) figures *G. gandavensis* and gives a botanical description wherein he states that it is distichously spicate. Although this is placed in that part of the description referring to the genus, the author must have known that most of the species of *Gladiolus* have secund spikes,

among them being *G. cardinalis* and *G. psittacinus*, the reputed parents of *G. gandavensis*. The evidence is strongly in favor of the idea that *G. gandavensis* is a hybrid between *G. psittacinus* and *G. oppositiflorus*.

About this time appeared *G. brenchleyensis*, raised by Mr. Hooker, of Brenchley. The earliest record (1848) of this gladiolus states that it is a hybrid between *G. psittacinus* and *G. floribundus*, but since then it has usually been considered as a form of *G. gandavensis*. Whatever its origin, it ranks next to *G. Colvillei* in being the oldest of existing types of gladioli.¹¹

Prior to 1850 — except for the work of Dean Herbert, whose breeding of gladioli was perhaps more scientific than practical — there had been no sustained effort in the improvement of the gladiolus. Every flower that has won an important place has had one or more great geniuses to develop it and thus make it known to plant lovers. M. Eugène Souchet, gardener for Napoleon III at Fontainebleau, was the greatest of the many breeders of gladioli. He began his labors about 1850 and continued them until shortly before his death in 1880. It is quite probable that he used *G. floribundus* and *G. ramosus* in crossing the varieties of *G. gandavensis*, but such was his ability as a breeder that his varieties took foremost rank at once and maintained the lead throughout his life. The work was then carried on by his nephews, Messrs. Souillard and Brunelet.

It must not be inferred that Eugène Souchet had a clear field as a gladiolus breeder, even in France, for others were at work. M. Courant, of Poissy, raised and introduced such varieties as Docteur Marjolin, Madame Thibaut, Keteleer, M. Loyre, in 1855, and Claire Courant, Keteleeri, Miniatus, in 1858. M. Truffaut fils, who worked much with forms of *G. ramosus*, produced in that section the following varieties: Mademoiselle Sosthenie, a famous hybrid between *G. ramosus* and *G. floribundus*, in 1848; Bernard de Rennes and Madame Bertin, in 1850; Madame Vilmorin and Imperatrice Eugénie, in 1855; Comtesse de Saint Marsult, Arc-en-ciel, Madame Hardy, President Decaisne, in 1858; and Comte de Paris, Marguerite Regaud, Napoleon III, in 1860. Among the *G. psittacinus* x *gandavensis* hybrids produced by M. Truffaut were Madame Souchet, Madame Truffaut and Charles Rouillard, sent out in 1855. M. Domage, of Montrouge, offered Premices de Montrouge, in 1858, Eugène Domage, Mademoiselle Marsault, Solferino, in 1860, Solfaterre, in 1861, and Madame Domage, in 1862. A. Malet, of Plessis-Picquet, introduced Antiope, Madame Marc Caillard, Madame Place, Madame Vilmorin, in 1858, and Anacreon Cardinal, M. Morel, Gustave Malet, in 1861. M. Duval, of Petit Bicêtre, placed before the public Madame Duval, M. Leroy, and Ernest Duval, in 1862. Eugène

¹¹ *G. ramosus* is regarded as a group of which the original form is probably lost.

Verdier, of Paris, sent out Eugénie Verdier, Madame Eugène Verdier, Olympe Lescuyer, and Victor Verdier, in 1858.

A few years after M. Souchet began the improvement of gladioli, an event occurred which had far-reaching results — if not politically, at least in the history of the gladiolus. This was the visit of Queen Victoria to Fontainebleau in August, 1855. During her visit the flower borders were enlivened with cut spikes of gladioli thrust in vases of water among the common border plants. The result is best described in the words of a writer of the time (Anonymous reference, 1862):

Few flowers have made in so short a space of time such rapid progress in public favour as the Gandavensis varieties of the gladiolus. . . . The French were beginning to draw our attention to the bulbs, and new varieties were reaching us from the other side, when our gracious Sovereign gave a great impulse to their culture by taking them under her special patronage. Their being placed on the royal table led the frequenters of the Court to follow the example set them, and a demand almost unprecedented in the history of flowers has arisen. Fortunately they increase very rapidly, and hence they are being generally distributed over the country; and before this unhappy war broke out in America were being eagerly sought for there, for one Paris firm this time last year was looking out for 30,000 bulbs to supply one order.

English breeders had not kept pace with their brethren in Belgium and France, and with the exception of the achievements of Dean Herbert and Mr. Cole there is little to record until about 1859 or 1860, when John Standish began to grow seedlings. He continued the work for several years. Many of his varieties were figured by color plates in the floral magazines of the time, but inasmuch as he was not given full credit for his efforts attention should be called to the great number of varieties originated by him. Among these were Adam Bede, Adele Souchet, Agnes, Alice Gray, *Alice Wilson,¹² Aurelian, Bacchus, Basil, Beauty of Bagshot, Belle of Bagshot, Blair Athol, Brian Boru, Bridesmaid, Carlotta Grisy, Carminata, Caroline, Castor, *Charles Davis, Clara, Colleen Bawn, Colonel Hook, Cordelia, Daphne, Diana, Dr. Blount, Dr. Hogg, Donald Beaton, Don Juan, Duchess of Sutherland, Earl Carlisle, Edith Dombtrain, *Eleanor Norman, Elfin, Etna, Eugène Domage, Excelsior, Garibaldi, General Cabrera, General Lee, Goldfinder, Guido, Harlequin, Herr Rosenberg, Ivanhoe, John Leach, *John Standish, Joseph Maston, Juliet, Kathleen, Ketterii, *Lady Alice Hill, Lady Caroline Legge, Lady Emily Seymour, Lady Marshall, Lady M. Hood, Lady Morgan, Lemonade, Lord Clyde, Lord Kenlis, Lord Shaftesbury, Lucy Neal, Mlle. Patti, Minerva, Miss Foster, Miss Glegg, Miss Graham, Miss Howell, Miss Ingram, Mr. Duffield, *Mr. J. W. Lane, Mr. Menzies, Mr. Rucker, Mrs. Dix, *Mrs. Dombtrain, Mrs. E. Nott, Mrs. Hogg, Mrs. Menzies, *Mrs. Moore, Mrs. Peach, *Mrs. Reynolds Hole, Mrs. Ridley Hunter, Mrs.

¹² The varieties marked with an asterisk have been figured by color plates in the *Florists' Magazine* or similar publications.

Siddons, *Mrs. Standish, Mobray More, Norma, Oberon, *Our Little Lucy, Poniatowski, Prime Minister, *Randle Jackson, Reine Victoria, Reverend Joshua Dix, Robin Hood, Rose of England, Samuel Weymouth, Scottish Chief, Senior Jackson, Sir Isaac Newton, *Sir James Clarke, Sultane, Susan Ingram, The Caliph, The Cardinal, The Colonel, The Dauphin, The Ensign, Thurza, Tom Moore, Viola, Whipper-in, William Menzies.

These were excellent exhibition varieties, equal if not superior to those sent out in France; but it seems that the conditions were not so favorable for their multiplication, and thus the varieties were never generally distributed and consequently in a few years were lost. Later Mr. Standish moved to Ascot, where he again took up the breeding of gladioli, producing some *branchleyensis-cruentus* hybrids.

Meanwhile J. Sladden produced some seedlings of merit — Hector, Lord Clyde, Prospero, and Volunteer — which won the first prize of the Royal Horticultural Society in 1863. Although the efforts of Standish served to promote to a certain extent the popular interest in gladioli through exhibitions, there appeared simultaneously with him one who may be regarded as the Souchet of England, James Kelway. Kelway, establishing himself at Langport under different conditions and with a keen judgment of the requirements demanded of new seedlings, was successful; and his successors have maintained the high reputation of the firm for high-grade gladioli. Kelway sent out his first varieties in 1866.

The species *purpureo-auratus*, introduced in 1870, was found to be perfectly hardy at Nancy, France. Victor Lemoine discovered after a test of two or three years that original corms had multiplied so as to form good-sized clumps. The varieties of *G. gandavensis* had not proved successful in the soil at Nancy, and so, very naturally, Lemoine conceived the idea of hybridizing the hardy species with the more brilliant-flowered garden type. He procured some of the best varieties of *G. gandavensis* and used pollen from them on his *G. purpureo-auratus* plants in 1875. The result was three seedlings, of which two were afterward named and the third was suppressed because its colors were not desirable. The hybrids proved to be hardy, like the female parent. Lemoine says that the seedlings were identical in habit, hardiness, height, size and form of flowers, and size and form of the blotches on the lower segments, which were purple bordered with yellow. The named varieties were distinguished by the general color of the corolla, which in *G. Lemoinei* was rosy white and in Marie Lemoine was straw color. These varieties were put on the market in 1880; in 1882 five more varieties were offered, and in autumn of the same year seven varieties were added to the list. In 1881 the English journal *The Garden* called attention to a similar hybrid, called *G. pur-*

purpureo-auratus hybridus Froebeli, which very much resembled the variety Marie Lemoine.

Other plant breeders used the *Lemoinei* varieties to cross with the best varieties of *G. gandavensis*. Among these producers were: Deleuil, of Marseilles; Trefoux, of Auxerre; Torcy-Vaunier, of Melun; Souillard and Brunelet, of Fontainebleau; Haage & Schmidt, of Erfurt; and Krelage, of Haarlem.

Although developed simultaneously with *G. Lemoinei*, the hybrid *gandavensis* x *Saundersii* — produced by Herr Leichtlin and known as *G. Leichtlinii* and later as *G. Childsii* — was not generally distributed until after *G. nanceianus*. When the stock of *G. Leichtlinii* passed into the hands of M. Godefroy-Lebeuf, it is said that he sold mixed corms but did not name any of the seedlings of this class. Having purchased some of the stock and having also some corms from Herr Leichtlin, M. Lemoine was aware of the improvement shown in this group and therefore was led to undertake the crossing of *G. Lemoinei* and *G. Saundersii* which resulted in producing *G. nanceianus*. *G. Childsii* (formerly called *G. Leichtlinii*) seems not to have interested European growers, probably because of their interest in the fine varieties of M. Lemoine. In America, on the other hand, the *Childsii* varieties found favor, and through the efforts of American cultivators the flowers have been improved in substance. M. Froebel, of Zurich, in 1889 sent out *G. turicensis*, a variety produced by crossing *G. Saundersii* with *G. gandavensis*, which is the same cross as that made by Herr Leichtlin and therefore has been regarded as the same as *G. Childsii*.

The *purpureo-auratus-gandavensis* hybrids, known in horticultural literature as *G. Lemoinei*, were crossed on *G. Saundersii* (introduced in 1872) by M. Lemoine in 1883. The result was four seeds from which the seedlings afterward named President Carnot and Maurice de Vilmorin were chosen in 1885. These varieties were remarkable for their large flowers and numerous dots of color. The originator claimed that this class was also hardy. The first varieties (nine in number) from this cross were introduced in 1889, and these with other seedlings were shown at the Universal Exposition in Paris in that year. This group has been known as *G. nanceianus*.

G. Victorialis was introduced in 1893 by Dammann & Co., of San Giovanni a Teduccio, near Naples. This variety was described as a hybrid between *G. byzantinus* and *G. cardinalis*, or between a European and a Cape species, and, if correct, it was the first hybrid of such parentage on record. The firm's catalog for 1893 stated that the variety was hardy and belonged to the early-flowering class or group. In habit the plant was intermediate between the parents; the flowers were pink or dark red, and the inner segments were striped as in *G. cardinalis*. The season was about the middle of April and the flowers were somewhat scented.

The class was recommended for market and for cutting, and especially for hybridizing. Five varieties were offered, as follows: *Amathusia*, *Amphitrite*, *Andromeda*, *Penelope*, *Eris*. It appears that specimens were sent by Mr. Sprenger, of the firm of Dammann & Co. to J. G. Baker, who described this new gladiolus in the *Gardeners' Chronicle* of May 20, 1893, but ascribed it to a cross between *G. communis* and *G. cardinalis* or *G. Colvillei*. Endicott (1897) says that *G. Victorialis* is not so good as *G. byzantinus*, and that he saw no evidence of African blood. Apparently the class was of little value, since it seems not to have been cataloged by the introducers for more than a year.

When the above-named specimens were sent by Mr. Sprenger to Mr. Baker there was included a *papilio-gandavensis* hybrid, which was described. Later Mr. Sprenger sent six hybrids, as follows: *communis* x *Colvillei*; *communis* x *Colvillei albus*; *communis* x *cardinalis*; *ramosus* x *cardinalis*; *papilio* x *cardinalis*; *papilio* x *angustus*. These were not described, and the writer could not ascertain whether or not any of them found their way into the market. They are of interest to botanists and plant breeders in view of Dean Herbert's opinion regarding the possibility of uniting the species of Europe and South Africa.

Another interesting class of gladioli was the *Glaïeuls à épi rond*, the first varieties of which, *Triomphe de Paris* and *Mme. Casimir-Perier*, were introduced by Cayeux et Le Clerc in 1902. These gladioli with flowers all around the stem were a novelty, and the following additional varieties were sent out: *Eureka* (Lem., 1903); *Triomphe de Nancy* (Lem., 1905); *Caprice* (Lem., 1906); *Couronnement* (Lem., 1908). They were of passing moment, however, and have almost disappeared.

In 1905 Roger de la Borde exhibited his Giant-flowered Hybrids, which he claimed were the result of crossing several species with a very severe selection of the seedlings. The flowers were large, some of the varieties having flowers twenty-two centimeters in diameter, while the American varieties under the same conditions were only thirteen centimeters. The colors were delicate. The spikes were furnished with from four to six flowers open at one time.

G. primulinus, which flowered at Kew in 1890, has in recent years been used in hybridizing with other races and species of gladioli. This species seems to have come into commercial notice in France in 1905, and in the United States through Thorburn in 1908. Cayeux et Le Clerc obtained a number of seedlings of *G. primulinus*, using different and more or less yellow-flowered varieties of *G. Lemoinei*, *G. nanceianus*, and *G. gandavensis*. They also made reciprocal crosses. Crosses with such *gandavensis* varieties as Hohenzollern and Safrano gave the best results. Seventy per cent of the seedlings were yellow and hooded, as in the type. The *nanceianus* crosses gave less pure colors, the flowers being striped with shades of

red and in several cases with novel shades of copper or coppery bronze. With the *Lemoinei* variety Henry Lemoine, the seedlings ranged in color from almost pure yellow to pure yellow, but retained the pronounced hooded upper petal.

These first hybrids were crossed with the largest yellow-flowered *gandavensis* varieties. The resulting hybrids, flowering in 1909, had large, well-open flowers, in colors ranging from clear yellow to golden yellow. In addition, distinct salmon and chamois shades appeared, which offered a field for further work in gladiolus development.

Langprim gladioli is the name given by Kelway for his strain of *primulinus* hybrids produced by crossing with varieties of *G. Kelwayi* and *G. gandavensis*. *G. primulinus* used on the *Kelwayi* varieties has thus far given the best results. The seedlings show marked *primulinus* characters, especially in regard to color and form, giving a series of colors ranging from lemon-white to orange, suffused with red.

Lemoine evidently began experimenting with *G. primulinus* soon after its introduction into Europe, and in the autumn of 1908 he offered *G. primulinus major*, *G. primulinus maculatus*, and *G. primulinus salmoneus*. In 1910 he sent out *G. primulinus concolor* and *G. primulinus erectus*.

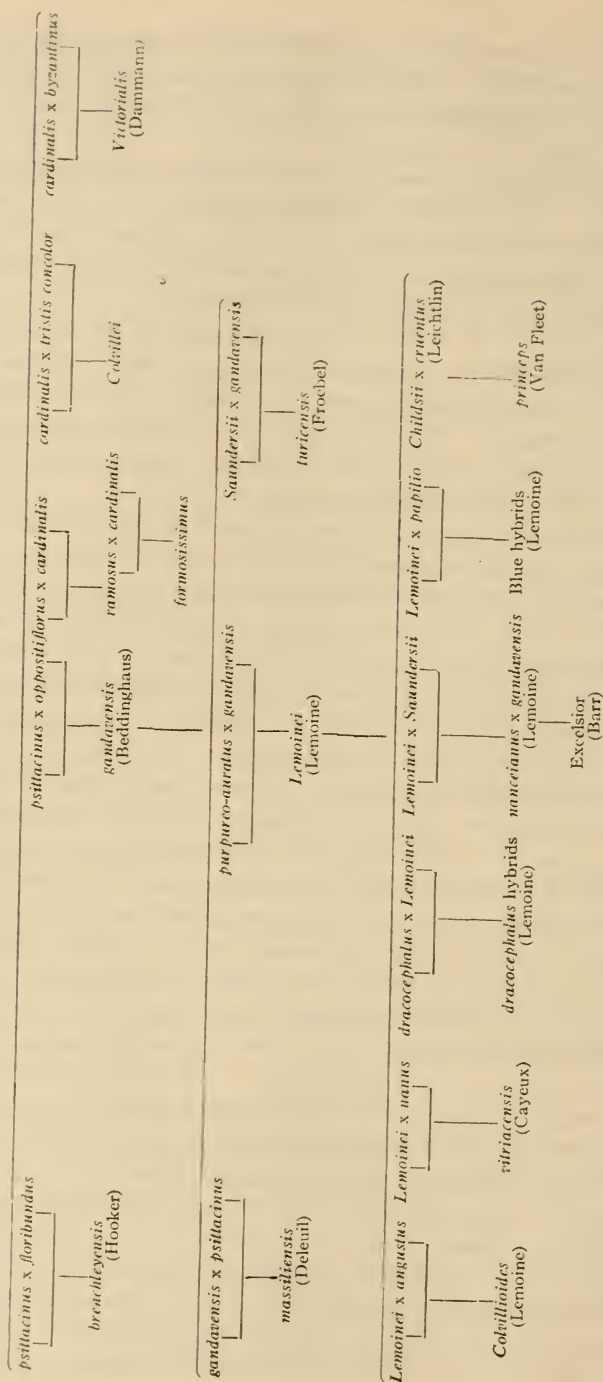
Recent development in the gladiolus is marked by the attempt of the French gladiolus breeders to produce a type that will flower in the interval between the early dwarf varieties, *G. Colvillei*, *G. communis*, and *G. segetum* on the one hand, and *G. nanceianus* on the other.

About 1902 M. Porcher-Dionneau, of Ponts-de-Cé, conceived the idea of crossing *G. nanceianus* with *G. Colvillei* to produce an earlier-flowering strain. Each year he selected from the seedlings those that flowered first but that retained the rich coloring and large size of *G. nanceianus*. He exhibited his varieties in 1910 and they are figured in the *Revue Horticole*, where it stated on M. Porcher-Dionneau's authority that, when planted with *G. Colvillei* in March, the *Glaieuls hâtifs Ponts-de-Céais* flowered at the same time, but the flowers measured from sixteen to twenty-two centimeters in diameter and had the rich colors of the *nanceianus* class.

Cayeux et Le Clerc, in 1913, introduced *G. vitriacensis*, a hybrid between a *Lemoinei* variety and some of the early dwarf hybrids known as *G. nanus*. The plant grew one meter high and bore medium-sized flowers having the characteristic blotches of the dwarf type. The period of bloom was in the interval between the season of the early-flowering varieties and the late-flowering group.

These results indicate that where the dwarf types are hardy it is possible to have gladioli in the open ground from April or May until the latest of the tall late varieties are over — a period of six months.

The parentage of some of the principal hybrid species is shown in the following table:



HISTORY OF GARDEN SPECIES

Gladiolus alatus Linn. (Wing-flowered Gladiolus) is a native of the Cape of Good Hope and was among the first species introduced into Europe. The corm is round, compressed, and small, about the size of a small crocus. The leaves are from three to four in number, narrowly sword-shaped, somewhat leathery, without a middle nerve but streaked with parallel fine furrows. The stem varies from a few inches to a foot in height, and bears from five to ten flowers. The segments are very unequal, the uppermost being one-half the width of the two lateral ones, and the lower segments narrower. The flowers are bright red, and small like those of sweetbrier. Ker thinks that presumably the specific name was suggested to Linnæus by the extended wing-like appearance of the upper lateral segments of the corolla, rather than by the somewhat winged stems. Although it is one of the so-called hardy species, it endures but little cold; yet, on the other hand, it cannot be kept out of the soil except for a short period. According to Ker it is propagated very easily by seeds and cormels, although it is not so easily brought into flower, which he attributes to lack of sufficient heat.

This species is common in the western coast districts of South Africa, where it flowers in the spring. In the south it inhabits the low hills and flats; in the north, due to the less amount of rainfall, it is not found on the plains, but only on mountains in locations where soil and moisture are congenial to it. When the plant is not set deep enough it throws out several anchor roots which, according to Marloth, serve, when shriveling at the beginning of the dry season, to drag the new corm downward until by a series of annual descents the plant has reached its proper depth.

G. angustus Linn. (Narrow-leaved Gladiolus) was one of the first (if not the very first) of the African species to be introduced into Europe. The leaves are narrow, upright, shorter than the stem, and with a single prominent midrib. The stem is from one to two feet high. The flowers are from three to five in number, about four inches long, straight, narrow funnel-form, one-ranked, and scentless. The three upper segments are broad, the middle one being the broadest, the lower ones rather narrower, all flat and spreading. The color is usually described as white, and the lower segments are marked by a spade-shaped purple blotch. The color plate in *Curtis's Botanical Magazine* (tab. 602) shows a red blotch with a distinct eye of the same color as the segment, and the spot is connected with the base by a red line down the center of the petal. The flowers appear in June. This species, says Ker, propagates easily by seeds or cormels. The species was probably first noticed by Breyne, and was

described and figured by Linnæus in *Hortus Cliffortianus* in 1737. It was cultivated by Miller in 1757.

G. atrovioaceus Boiss. was introduced in 1889. It is therefore not very well known commercially. The plant grows from one to one and one-half feet tall, bearing linear, closely ribbed leaves. The spikes are not thicker than a slender pencil and bear from four to eight flowers. These are narrow and tube-like, with a small hood, and the colors are navy blue, purple, and white. Fuld (1912) reports that corms of this species planted in a cold frame in October and covered during the winter with sash, were discovered in active growth in March. Later the sash were removed, and the plants flowered on May 15. Bulbs planted in a greenhouse in December, according to Fuld, were in flower within two months. While the stems were not so long as those on the plants grown in the coldframe, the flowers were as graceful. If this proves to be the general experience, there can be no doubt as to the usefulness of this species for growing under glass, and it may prove a foundation for the development of a true forcing type.

G. blandus Ait. (Fairest Gladiolus) has corms of medium size. The leaves are sword-shaped, nerved, and shorter than the stem, which is from one to two feet high and bears from three to ten large flowers. The segments vary much in size and form in the different varieties; the lower segments are the narrower. The perianth is white, tinged with red, the lower segments with a reddish blotch at the throat. The flowers appear in June and are scentless. The plant blooms freely and propagates readily by both seed and cormels. The species was introduced into Kew in 1774 by Masson. In the figure of the species in *Curtis's Botanical Magazine*, the plant is shown with conspicuous red lines or markings on the spathes.

G. blandus var. *albidus* Jacq. (Snow-white Gladiolus) has stems one foot long, which bear three flowers. The flowers are almost pure white, there being only a very light stain on the backs of the petals before they expand.

G. blandus var. *carneus* De la Roche (Pale Purple Gladiolus), known in the early lists as *G. campanulatus* Andrews, is a more robust form, with large, lilac or mauve, flowers. The upper segments are broad and overlap one another; the lower ones are narrower but overlap, are lighter in color than the upper segments, and are marked by a crescent-shaped red spot. This form was introduced in 1796.

G. blandus var. *excelsus* Sweet is a taller-growing and larger-leaved form of the species.

G. blandus var. *Hibbertii* Hort. has pink flowers with very distinct spade-shaped blotches on the three lower segments.

G. blandus var. *Mortoni* Herb. has stems one and one-half feet long. The flowers are white, with copious faint vertical streaks. The variety was introduced about 1835.

G. cardinalis Curt. (Superb Gladiolus), a beautiful Cape species, was given its common name because it grows from three to four feet high, bearing from twelve to twenty bright scarlet flowers, with the lower segments of the perianth marked by a large diamond-shaped white blotch. It is figured in *Curtis's Botanical Magazine*, tab. 135 (1790), where the statement is made that the species was introduced into England from Holland by Graffer and was first flowered by Lewis & Mackie at Kingsland. Aiton says it was introduced by Graffer in 1789. The species flowers in July and August. It is just hardy in England, and dampness affects the corms — which, however, are intolerant of being out of the ground long, and consequently it was the practice of growers to plant this species in the fall. Allen says it rarely flowers if planted in the spring.

This species is one of the parents of *G. Colvillei*, *G. ramosus*, *G. pudibundus*, *G. candidus*, and *G. incarnatus*. It is thought by some be a parent to the *gandavensis* race, but the plant-breeding evidence, and to a certain extent the characters of the early varieties of this type, are against this being a fact. A rose-colored variety called *subroseus* was raised from *G. cardinalis* by Jacques in 1847 from seed produced in 1844. According to Marloth, this species is found on the moist cliffs and grassy ledges of waterfalls in the Wellington, Paarl, and Frenchhoek Mountains, flowering in midsummer (January). The corm is small but is provided with numerous long, thin, much-branched roots, which spread widely in the boggy soil. The species appears to flourish under conditions favorable to *Disa uniflora*, and sometimes the two may be found flowering together. The flowers are bright scarlet and crimson; the uppermost petal, the largest and hooded, is somewhat paler; the three lower petals and sometimes those adjoining them have a white blotch. The flowers are faintly scented like some lilies. In nature the plant hangs from cliffs, the stems are from three to four feet long, the leaves are from two to three feet long, and there are from five to ten flowers on the hanging spike. Whether the spike is hanging downward (as found under natural conditions) or is cut and placed in an upright position in water, the flowers are always in the normal position — that is, with the hooded segment uppermost. This is due to a turn of the tube which enables the flowers to adjust themselves to conditions under which the individual buds open, and appears to be an adaptation for butterflies and birds, which visit the flowers for the nectar in the narrow tube and accomplish fertilization of the flowers by brushing against the stamens or the stigmas that arch over underneath the hood.

G. cruentus Moore (Blood-red, or Bloody, *Gladiolus*) was introduced into England by William Bull, of Chelsea, in 1868. In his catalog for 1871 he offered the novelty and thus describes it:

A very beautiful and entirely novel species of this popular genus introduced from Natal. It is not only a very showy plant, but also one of a very distinct character and is an acquisition for the flower garden on account of its vigorous habit of growth and large brilliantly coloured flowers. It produces a tall scape, two feet high or upwards, furnished with long flag-like glaucous leaves nearly an inch wide, the scape terminating in a distichous spike of large, broadly campanulate, subringent flowers of a bright blood-red colour, the upper segments uniformly coloured and the lower smaller ones crimson at the base and scarlet at the apex. The two lateral segments of the lower lip are marbled about halfway down with a white zone dotted with crimson, which on the exterior edge runs out into a long point, like the flame of the Florist Tulip. This distinct species has been figured both in the *Botanical Magazine* and in the *Florist and Pomologist*. The price per corm is one guinea.

The flowers are from six to ten in number and appear late in September. The spikes possess the valuable quality of developing after being cut and placed in water. The corms are distinguished by their bright yellow color, globular form, large size, and thin covering.

This species is very sensitive to soil conditions, but, according to Van Fleet, if healthy corms are planted in nearly pure sand with a stratum of peat for a root run, kept fairly moist, and afforded plenty of sunshine, the plants will be strong and leafy with plenty of bloom. The plants will not grow in clay soil and seldom thrive in rich garden loam.

The first hybridizer to use this species was John Standish, of Ascot, England, who in October, 1871, exhibited a *brenchleyensis-cruentus* hybrid before the Royal Horticultural Society. The following year this hybrid was named Alice Wilson. A color plate of it appears in the *Florist and Pomologist* for 1873, page 73. T. Moore says it has more the form of a lily than that of an irid. The flowers were comparatively small, with a white center, a marginal coloration of rosy carmine, and little of the flame-like marking on the lower perianth segments, thus rendering the lily-like illusion all the more striking.

G. princeps was originated by Van Fleet from *G. cruentus* crossed with *G. Childsii* (*G. gandavensis* x *Saundersii*). This variety, says the originator, almost exactly reproduces the crimson-scarlet coloring with white and cream feathering in the lower segments, but the flat, circular flower is expanded to six inches in diameter both ways. The plant also is doubled in size in all its parts. This hybrid retains the peculiarity of *G. cruentus* in producing blunt-appearing spikes with apparently few flowers. Growth continues, however, until sometimes as many as twenty flowers are produced. The spikes show something of the same tendency when cut and placed in water that is kept fresh by frequent changing.

G. cuspidatus Jacq. (Tall Gladiolus), a native of Cape Colony, was introduced more than a century ago. The corms are small, being less than three-fourths of an inch in diameter. The three leaves are narrow, flat, and rigid. The stem is from two to three feet long. The flowers vary from four to eight in number. The segments are shorter than the tube, and generally waved. The upper segments are broadest: the uppermost one is nearly straight, but is recurved at the end. The color, according to Baker, is white or pale pink, with a spade-shaped blotch on each of the three lower segments. The plate in *Curtis's Botanical Magazine* for 1802 (Ker, 1749-1825, tab. 582) shows a yellowish white flower, with blotches of red, white center, and margins of purple; the anthers are shown as blue. The flowers appear in May. This species was introduced into Europe in 1785.

G. dracocephalus Hook. f. (Dragon's Head Gladiolus), a Natal species, was introduced by Wilson Saunders and flowered at Reigate, England, in August, 1870. It was discovered by Cooper in that part of Natal west of the Drachenberg Mountains. The flowers are yellow-green closely striped with dull purple-red on the upper segments, and bright green spotted with purple on the lower segments, which are much smaller and are recurved. The two outer segments are wing-like with recurved tips: the upper segment is arched and hooded. The stem is one and one-half feet high, bearing from five to seven flowers. This species has been used in crossing with *G. gandavensis* and *G. Lemoinei*.



FIG. 9. GLADIOLUS DRACOCEPHALUS

G. grandis Thunb. (Large Brown Afrikander) is found in the western part of Cape Colony, where it flowers in the spring. The larger flowers are sweet-scented in the evening. The perianth is yellowish, more or less tinged with purplish brown. The flowers vary from one to five, on stems from two to two and one-half feet long. The two or three leaves are strongly ribbed. The corms are small, from one-half to three-fourths inch in diameter.

Marloth (1915) distinguishes between *G. recurvus* and *G. maculatus* Sweet (Small Brown Afrikander). The latter, though similar in shape and color of flower to *G. grandis*, is only about half the size, and flowers in the autumn (May-June in the South Temperate Zone). The color is a deeper brown. Marloth says it is readily known by its extremely strong, almost narcotic, scent, which is especially noticeable in the evening. Baker makes *G. maculatus* Sweet a synonym of *G. recurvus*, but Marloth says *G. recurvus* has a pleasing fragrance and a different season of flowering, as well as a different form of leaves.

G. oppositiflorus Herb. is found in Transkeian Kaffraria, not, as Herbert supposed, in Madagascar; no collector has found it in the latter country. The corms are large. The leaves are from three to four in number, sometimes as many as six, crowded, ensiform, glabrous, and shorter than the stem. The whole plant is usually three feet tall, and occasionally five feet. The flowers number from thirty to forty in a dense, two-ranked spike. The flowers are large, and white with mauve-purple or amethyst stripes. Van Fleet says this species is of tall growth, bearing from eighteen to twenty-four blooms almost simultaneously, of delicate peach and white tints. The species has been looked upon as the parent of the light-colored *gandavensis* forms, and plant breeders have sought to obtain the long-desired, meritorious, pure white variety by continued crossing of the best white varieties with the purest white seedlings of this species. The results indicate that such pure whites as have been obtained are of low vitality and reproducing power.

This species was described by Dean Herbert (1842), but had already been noted by him in his work on the Amaryllidaceae in 1837. Herbert called attention to the fact that the species was sold by Dutch nurserymen under the name of *G. floribundus*, an old name for a different plant — *G. floribundus* Jacq. The same plant was known as *G. flabellifer* Tausch, and Tausch (1836) states that *G. floribundus* Hort. Holland (non Jacq.) is a synonym. The citation of the same synonym seems to leave little doubt that the same species was under consideration, especially when there is nothing contrary in the descriptions.

The reference just given indicates some of the difficulty of determining what species were used in hybridizing. An illustration of *G. oppositiflorus*

was published in *Curtis's Botanical Magazine* from specimens collected more recently, but it is there stated that the plant was identical with herbarium specimens left by Herbert.

G. primulinus Baker is from Usagara Mountains, in Africa, and was first flowered at Kew in 1890 from corms sent by J. F. Last, who discovered it in 1887. It was reintroduced by Francis Fox, who procured some plants from Rain Forest, Victoria Falls, and flowered them at Wimbledon, England. C. E. Allen says it grows in "one of the wettest spots near the Falls in a perpetual deluge." When this species was introduced it was regarded as a distinct species, but later it was referred to *G. Quartinianus* A. Rich., which was introduced into cultivation by Sir John Kirk in 1884. The clear, uniform primrose color of the flowers, without any tendency toward markings, warrants its retention for horticultural purposes. At least *G. primulinus* has now become better known than *G. Quartinianus*, and in garden literature it will doubtless be retained.

G. psittacinus Hook. (Splendid Corn Flag) is from the Cape and has been called the parrot, or perroquet, gladiolus. In Holland it was early known as *G. Daeleni*, after Dr. Dael, of Brussels, who is said to have been the first in Europe to flower it. Reinwardt named it *G. natalensis*, and under one or the other of the latter names it appears in early literature. It was first flowered in Great Britain by Richard Harrison, of Liverpool, in 1830, from corms procured from Prince de Salm-Dyck. The species was figured in the *Botanical Register* (1831), tab. 1442, and in *Curtis's Botanical Magazine*, tab. 3032.

Sweet (1832-35) figured and described this species under the name *G. natalensis* Reinw., Natal Corn Flag. He says it was "introduced by Professor Reinwardt, of Leyden, who has liberally distributed bulbs of it to various collections both in this country and on the Continent. It is by far the largest in growth, and in beauty of its flowers it is not surpassed by any others of the genus. The plant seems to be quite as hardy as *G. byzantinus* and requires the same soil and treatment as that species." *G. psittacinus* is one of the parents of *G. gandavensis* Hort.

G. psittacinus var. *Cooperi* Baker has segments more acute than in the type, and the tube is from two and one-half to three inches long.

G. purpureo-auratus Hook. f., from Natal, was introduced by William Bull, of Chelsea (who also introduced *G. cruentus*), and was first flowered in England in August, 1871. This is the hardiest of the African species. The corms are large, and the cormels are produced on the ends of running rootstocks. The leaves are somewhat glaucous, narrow, and stiff. The stems are from one and one-half to two feet tall. From ten to fifteen blooms are borne in one rank on the spike. The color of the flowers is greenish yellow, with a diamond-shaped maroon blotch on the two

lower segments. The flowers are bell-shaped and the spikes bow-like. This species is valuable, not for its beauty, but as a parent of garden forms. It was used in the development of *G. Lemoinei*.

G. recurvus Linn. (Violet-scented Gladiolus) is a native of Cape Colony, and was grown by Miller from seed and flowered at Chelsea before 1760. The stem is from one to two feet tall, is slender, and bears three strongly ribbed leaves. The flowers are from two to six in number, sulfur-colored, suffused and broadly edged with lilac, and with three stripes on each petal. The flowers are very fragrant, with a scent described by some writers as similar to that of violets or orris root. The species flowers in the northern hemisphere in April and May. This species is considered the most fragrant of the genus. It is somewhat intolerant of moisture when not in flower, but otherwise it never fails to bloom when the corms attain proper age. Marloth, who distinguishes between this and *G. maculatus* Sweet, says the three upper segments are broader than the lower, and are pale or dark lilac, and the lower segments are yellow with mauve or lilac points and similar streaks. The plant is frequent in the Cape flats and elsewhere, where it flowers in the spring (August) and is known by the common name *Mauve Afrikandes*. This species was introduced into Kew in 1774, where it was named *G. carinatus*. Miller's description is full and complete, but his figure is incorrect as the stem is not branched.

G. tristis Linn. (Sad-colored Gladiolus), an African species, was given its name by Linnæus because of the color of its flowers, which, however, are scarcely somber enough to deserve the name. The color is pale yellow, with dark brown spots. The blossoms are sweet-scented from dusk to dawn. The flowers appear in April and May on stems one and one-half feet high. The leaves are linear, four-sided, and furrowed. This was one of the first species brought from the Cape, and was cultivated by Philip Miller as early as 1745.

G. tristis var. *concolor* Salisb. was formerly known as *G. concolor*. This plant is so named because of the almost concolorous white and pale yellow flowers. Like the type, it is fragrant in the evening. The foliage has the peculiar characters of *G. tristis*. Like the type also, it endures little cold, and because of its early flowering must be grown in a frame.

HYBRID GLADIOLI

The variety *Bellona* is a hybrid between *G. cuspidatus* and *G. papilio*, raised and introduced by Dammann in 1899. In his catalog for the year Dammann described it as "an early-flowered gladiolus of most peculiar form and color. Leaves green, narrow and lanceolated, stalk about sixteen inches high, very rich-flowered. Petals long, rolled and

pointed; leaves dark salmon, steel blue with black spots. A new gladiolus not yet seen."

G. brenchleyensis is usually considered a form of *G. gandavensis*, although the persistency with which it has retained its individuality through a period of more than sixty-five years might lend weight to the belief that it is more than *G. gandavensis*. The early history of *G. brenchleyensis* is not definitely known. In 1848 this variety was recorded as a hybrid between *G. psittacinus* and *G. floribundus*, raised by Mr. Hooker, of Brenchley, about 1846.¹³ The stock, or a considerable proportion of it, passed into the possession of the Youells, of Yarmouth, who were for years the largest growers of *G. brenchleyensis* in England. Their notable displays of this hybrid did more to direct the attention of the public to the merits of this excellent variety than did the efforts of any one else. The flowers are vivid scarlet, with pencilings of yellow in the throat. They are only medium in size, but the great number open at one time produce a brilliant effect. The plant is therefore very useful in the garden, where it is a vigorous grower. It is considered by many growers to be the best scarlet variety, and is grown for its good color for table decorations. In Europe this gladiolus is often recommended for bedding with *Galtonia candicans*. Barr, in 1905, introduced Mikado, a sport of *G. brenchleyensis* which was described as having flowers of a pale blush-rose shading to cream, with the lower petal striped crimson on a primrose-colored ground.

G. candicans is a *blandus-cardinalis* hybrid producing a pure white flower of good size and appearance. This was raised by Mr. Miller, of Bristol, about 1837.

G. candidus is a hybrid between *G. blandus* and *G. cardinalis*, raised by Mr. Miller, of Bristol, about 1837, and figured in Smith's Floral Magazine.

G. Childsii has been one of the most important types in America. It is a hybrid between *G. gandavensis* and *G. Saundersii*, originally produced by Max Leichtlin, of Baden-Baden, Germany. Leichtlin was perhaps the first to appreciate the value of *G. Saundersii*, which he used in 1874 in crossing with some of the best varieties of *G. gandavensis*. The first flowers appeared in 1877 and the influence of the cross was especially manifest in the size of the flowers, which, according to Leichtlin, measured four inches across. The results of this hybridization work were reported in 1882.

Leichtlin appears to have disposed of his stock in the autumn of 1882 to Godefroy-Lebeuf, of Argenteuil, France. This new class of hybrids, however, seems not to have met with favor at the hands of European

¹³ George Bunyard stated in 1910 that his firm obtained *G. brenchleyensis* from Hooker and sold it to the Youells. Henry Youell (1911), in an address before the American Gladiolus Society, gives an entirely different account of its origin.

growers, who were attracted by the new *Lemoinei* group, and corms of *G. Leichtlinii* Hort. passed into other hands. The stock was purchased in 1884 (Childs says 1887) by V. H. Hallock, who continued to raise seedlings until 1891, when he sold the entire stock to John Lewis Childs. Until that time these gladioli were usually known as *G. Leichtlinii*, after the originator; but as none of the stock was in the hands of commercial growers, Childs decided to change the name of the group to *G. Childsii*, and under this name he sent out the following varieties in 1893: Ben Hur, Columbia, Dr. Sellew, Henry Gillman, Mrs. Beecher, William Falconer. These were shown in a color plate in Childs' catalog for the year mentioned. The price was one dollar per corm, or five dollars for the set of six varieties. In 1894 the varieties Aurea Superba, Mrs. La Mance, Ruby, Splendor, Torchlight, and Tuxedo were added. No varieties were added the following year, but in 1896 thirty-four varieties were introduced. Thirteen were added in 1897, seventeen in 1898, and twelve in 1899.

Since 1899 many varieties have been sent out, and, while it is probable that at present there is not a distinct *Childsii* group except in so far as it is represented by some of the original varieties remaining in the market, it can be safely said that this group revolutionized gladiolus culture in America. Although the first varieties sent out were not favorably received by European and some American growers, nevertheless the general superiority of these varieties to the *gandavensis* varieties was recognized, and *G. Childsii* served as a foundation for further improvement by American hybridizers.

G. Colvillei is generally regarded as a hybrid between *G. cardinalis* and *G. tristis* var. *concolor*. Dean Herbert thought it was a hybrid between *G. cardinalis* and *G. blandus*. The variety originated with Mr. Colville at Chelsea in 1823. Sweet (1826-27) states that it was raised by Colville from seeds of *G. concolor* that had been fertilized by the pollen of *G. cardinalis*. He publishes a color plate of the flowers and gives the following description of the plant:

Stem slightly flexuose (in our specimen about 18 inches in height), eafy, slightly angular, glaucous. Flowers secund or all facing one side. Perianthium tubular, ringent with a six-parted spreading limb, of a bright red, with pale purple margins; tube scarcely as long as the spathe in the lower flowers and rather longer in the upper ones, bent forward near the limb; laciniae unequal, obtuse, upper one more than double the size of the others, elliptic, slightly twisted or incurved near the point, the others oblong with the margins also incurved or involute near the points; three lower ones marked with a white spot which is lanceolate in the lower one and ovate in the others running down in a narrow line to the base of the laciniae, on each side of which it is bright purple. Pollen white.

Baker (1892) describes this hybrid as having "bright scarlet sub-erect flowers, with oblong acute segments, with a lanceolate blotch of bright

yellow at the base of the three lower." The color as shown in the color plate in *Flore des Serres* (Van Houtte, 1873) shows yellow blotches bordered with white, which contrast with the bright color. The flowers of *G. Colvillei* are fragrant, which points to *G. tristis* or *G. tristis* var. *concolor* as one of the parents.

The white variety of *G. Colvillei* seems to have been discovered about 1872. It is said to have appeared as a sport in two horticultural establishments in Holland in the same year. It was figured, together with *G. Colvillei*, in *Flore des Serres* (Van Houtte, 1873). The plate shows a pure white variety with yellow lanceolate blotches on the lower segments. This sport, known as *G. Colvillei albus*, had colored anthers and was supplanted later by the variety with white anthers known commercially as *G. Colvillei*, The Bride.

G. Colvillioides, a hybrid produced by crossing a variety of *G. Lemoinei* with *G. angustus* (the latter a form closely related to *G. tristis*), resembles *G. Colvillei* but has yellow flowers. The leaves are long and straight, with prominent ribs. The stems are slender and erect, and bear medium-sized flowers. The color is a pure chrome yellow, with three triangular black spots or blotches. The normal time of flowering is the early part of July, but if the corms are planted in the autumn and protected during the winter by glass frames they may be made to flower with *G. Colvillei*. This hybrid was originated by Lemoine and was offered as a novelty in the autumn of 1903.

G. delicatus is a hybrid between *G. recurvus* and *G. blandus*, raised by Dean Herbert.

G. dracocephalus has long been known, but seems not to have been employed in hybridizing until recent years. Jackson (1889) described the *dracocephalus-gandavensis* hybrids of C. Sander as being of great size, strong, and floriferous. He states that a large proportion bear flowers entirely free from the stripes in the lower petals common to *G. gandavensis*. This is due to the *dracocephalus* blood and is a step toward self-color. Whether these hybrids were introduced is unknown.

The veteran hybridizer, Lemoine, offered his *dracocephalus* hybrids in 1900. These were produced by crossing *G. dracocephalus* and some of the varieties of *G. Lemoinei*. The form of the flowers indicates their origin, while the singular spots, or macules, produce a striking effect. The first varieties sent out were Cheret, Forain, Léonnee, Luc-Olivier Merson, Paul Baudry, and Roty. Since 1900 other varieties have appeared each year. A list of these varieties, together with the dates of their introduction, follows:

Arlequin.....	1904	Le Masque.....	1904	Ribera.....	1902
Benvenuto Cellini...	1902	Léonée.....	1900	Rigoletto.....	1908
Cham.....	1900	Louis Français....	1901	Robinson.....	1904
Chaplain.....	1901	Luc-Olivier Merson.	1900	Rodin.....	1908
Cheret.....	1900	Mars.....	1900	Ronsard.....	1903
Crafty.....	1900	Mascaraade.....	1907	Roty.....	1900
Daumier.....	1900	Michel-Ange.....	1902	Semaphore.....	1901
Dubufe.....	1901	Miracle.....	1907	Spirite.....	1907
Eugène Manuel.....	1901	Misanthrope.....	1906	Tabarin.....	1903
Falguière.....	1908	Mohican.....	1908	Tharsis.....	1906
Fatalité.....	1907	Mystère.....	1904	Thebiade.....	1906
Figaro.....	1906	Nabab.....	1906	Turlupin.....	1906
Forain.....	1900	Nostradamus.....	1907	Tyran.....	1907
Fragonard.....	1904	Papillon.....	1904	Ugolin.....	1907
François Villon....	1913	Paul Baudry.....	1900	Velasquez.....	1902
Henriot.....	1900	Pierre Gringore....	1903	Vendetta.....	1908
Illusion.....	1907	Quasimodo.....	1904	Virgile.....	1902
		Rabelais.....	1903	Watteaw.....	1904
		Radiant.....	1901	Werther.....	1902
				Willette.....	1900

Early Gladioli, Glaïeuls Precoces, are hybrids produced by Lemoine and offered by him in his catalog no. 149, for 1901-1902. It is there stated that these varieties are hybrids between some of Lemoine's earliest varieties and the little-known species *G. Leichtlinii* and *G. aurantiacus*. This race flowers, it is said, about a month in advance of the earliest of the previously-introduced varieties. When set out in April the plants flower in June; and if set out in the autumn with the protection of a glass frame, they develop their flowers at the same time as *G. Colvillei*. The varieties offered in the autumn of 1901 were Eclairer, Mesager, Pleiade, and Précocité. Since these were introduced there have appeared the following:

Alhambra.....	1906	Favori.....	1904	Melusine.....	1910
Aurora.....	1908	Fraicheur.....	1905	Oasis.....	1908
Brasier.....	1905	Giralda.....	1906	Parnasse.....	1910
Calchas.....	1910	Grenade.....	1906	Phenix.....	1905
Carmen.....	1906	Gyges.....	1910	Success.....	1905
Couquete.....	1908	Melrose.....	1908	Vision.....	1904
Embleme.....	1910				

G. excelsior covers hybrids of the best varieties of *G. gandavensis* crossed with *G. nanceianus*. The flowers are described as very large and open, ranging in color from salmon-scarlet to soft blush-rose with a scarlet or cream-colored blotch, or a crimson blotch on a white ground. Barr offered these varieties as a new strain in his catalog for 1903.

The name *Express Gladioli* has been applied to the crosses of *G. alatus* with *G. cuspidatus* produced by C. G. van Tubergen, jr., of Haarlem, Holland. Van Tubergen (1907:440) describes them as follows:

A selection of crosses between *G. alatus* and *G. cuspidatus* are dwarf-growing, very free-flowering gladioli which flower in the open ground quite three weeks before the

earliest of the *nanus* or *ramosus* sections, which, as is well known, precede the *gandavensis* and other strains in time of flowering from three to four weeks. These *alatus* × *cuspidatus* gladioli, apart from their usefulness in flowering so early in the open ground (end of May), are very welcome additions to the gladiolus family, as each bulb produces from two to five spikes of about a foot in height, with flowers of fair size and of a charming colour of rosy-salmon with golden-brown markings. They are admirable for filling small glasses for table decoration, and other choice floral work. This strain I named "Express."

G. formosissimus is a hybrid uniting the abundant flowering of *G. ramosus* with the colors of *G. cardinalis*, though not so brilliant as the latter. It first flowered in 1842, and for many years was one of the leading varieties of the early-flowering group.

G. fragrans is a hybrid between *G. recurvus* and *G. tristis*, raised by Dean Herbert. The flowers are variegated and sweet-scented. The plant is moderately hardy.

G. gandavensis is probably a hybrid between *G. psittacinus* and *G. oppositiflorus*. It was originated by M. Beddinghaus, gardener to the Duc d'Arenberg at Enghien, who made some crosses in 1837. One of the resulting seedlings, which was much admired by all who saw it, passed into the control of Louis van Houtte, of Ghent, who named it *G. gandavensis* and introduced it in his catalog no. 6, for 1841. He described it in glowing terms, as follows: "In stateliness and color it exceeds all others we have seen among gladioli. Its dimensions surpass *ramosus*; its majestic flowers to the number of eighteen or twenty are of the most charming vermilion; their inferior petals, adorned with chrome, amaranth, and brown, are relieved by anthers of an azure blue which descends to the center of the flower. At the moment I write all Ghent comes to admire it." Van Houtte thought it a hybrid between *G. psittacinus* and *G. cardinalis*, but this is doubtful.

This variety was the foundation of a new race which has been known as *Gladiolus gandavensis*. Probably two thousand varieties have been named and sent out. This group led all others for garden planting from about 1850 to 1880, when the *Lemoinei* varieties came in, closely followed by the *nanceianus* and *Childsii* varieties. It is still important, and may be regarded as holding a position in gladiolus development in some respects analagous to that of the hybrid perpetual roses in the evolution of garden roses.

G. haylockianus is a hybrid between *G. recurvus* and *G. blandus*, raised by Dean Herbert. Mrs. Loudon describes the flowers as pale and slightly variegated.

G. Herbertianus is a hybrid between *G. tristis* and *G. spofforthianus*, raised by Dean Herbert.

G. incarnatus is a hybrid between *G. blandus* and *G. cardinalis*, raised about 1837 by Miller, of Bristol. It produces large, well-formed flowers of a pale pink color.

G. insignis is described in *Paxton's Magazine of Botany* (volume 7, pages 223 and 224) as a handsome hybrid with very long narrow leaves, and apparently drooping flower stalks on which the blossoms are borne chiefly on the upper side. The flowers are of a rich reddish crimson hue, with a dash of bluish purple in the center of the lower segments of the perianth. The parentage of this hybrid is unknown, but it was probably raised by Colville, as it was found in a collection purchased by Lucombe Pince & Co., of the Exeter Nursery, at the sale of Colville's nursery. It flowered with the new owners in July, 1839, and is figured on a color plate in *Paxton's Magazine of Botany*, volume 7 (1840), page 223.

G. Lemoinei (Large Spotted Gladioli) forms a group which had its origin in a hybrid made by Victor Lemoine between *G. purpureo-auratus* and some of the best *G. gandavensis* varieties. The original cross was made in 1875, and three seedlings were obtained, of which two — *Lemoinei* and Marie Lemoine — were named and later sent out. The new hybrids were exhibited at the Universal Exhibition in Paris in 1878, where they attracted considerable attention from amateurs. The two varieties were identical except in general color effect. *Lemoinei* was rosy white and Marie Lemoine straw color, both having on the lower segments large blotches of purple bordered with yellow. The two varieties were hardy, like the female parent, in the open ground at Nancy. In 1880 these varieties were offered for sale, and in 1882 five additional varieties — Lafayette, Cavaignac, L'Abbe Gregiore, John Thorpe, and Rochambeau — were introduced. To these were added, in the autumn of 1882, *Enfant de Nancy*, *Victor Hugo*, *Stanley*, *Adeliaque*, *Cleopatre*, *Christophe Colombo*, *Incendie*, and *Mars*.

Varieties with a tendency toward blue appeared early in the development of this type. Gambetta (1885), Emile Galle (1887), Baron Joseph Hulot (1896), represent the successive steps in the development of the blue varieties.

G. Lowii is said by De Jonghe (1843) to have the same parentage as *G. gandavensis*. It was offered by Jacob Makoy in 1842.

G. massiliensis is a hybrid of *G. psittacinus* and *G. gandavensis*, and was announced by Krelage as a new race in 1892. The hybrid was the result of testing the opinion held by some growers, that in order to secure greater vigor and resistance to disease it would be necessary to turn again to the world's species and use these in further crossing. This hybrid had, it was said, all the bad qualities of *G. psittacinus*, and it was apparent that the modern gladiolus had certain qualities resulting from its fifty years of improvement which could not be ignored by plant breeders if their results were to meet the approval of gardeners and florists.

G. mitchamiensis is a hybrid resulting from crossing *G. tristis* and *G. hirsutus*. It is named after Mitcham, where Dean Herbert, who raised it, resided about 1810. The flowers are beautifully variegated, inclining toward *G. tristis*.

G. nanceianus is a hybrid produced by crossing *G. Saundersii* with some of the first *Lemoinei* varieties. The flowers are larger than the *Lemoinei* varieties, well open, and marked with peculiar mottling or with short, fine, often parallel, strokes of contrasting colors. The plants of the different varieties vary considerably in vigor, some exceeding any of the varieties of the other garden groups. The spikes of some of the more vigorous *nanceianus* varieties are often six feet high and bear flowers seven inches across. As in the case of *G. Lemoinei*, the varieties sent out by Lemoine are hardy under conditions similar to those of the place of origin. The first varieties, President Carnot and Maurice de Vilmorin, resulted from the crosses between *G. Lemoinei* and *G. Saundersii* in 1883. The seedlings flowered in 1885 and were placed on the market in 1889. These forerunners of a new type were shown at the Universal Exposition in Paris in 1889, and exhibited in the same year by Veitch & Son at the meeting of the Royal Horticultural Society in London.

G. nanus (Dwarf Gladioli) is the term applied to a number of early-flowering dwarf gladioli which differ from one another in the arrangement of flowers and in the disposition of the spots of color. Most of them are probably derived from *G. cardinalis* and *G. ramosus*, although *G. blandus*, *G. tristis*, and some others are probably concerned. This class has been largely developed by florists of the Channel Islands and in the Low Countries. The literature concerning the varieties is scanty or not readily available. *G. Colvillei* is undoubtedly the oldest variety of this class, and its white form (*G. Colvillei albus*, The Bride) is extensively employed for forcing.

G. odoratus is a hybrid between *G. hirsutus* and *G. spofforthianus*, raised by Dean Herbert.

G. praecox forms a group reported to have arisen from intercrossing the earliest varieties of *G. gandavensis*, *G. Lemoinei*, *G. Childsii*, and *G. nanceianus*. It is said that in color and size the flowers are the equal of those of any other group. The especial merit of this new group is that it can be grown from seed since seedlings flower the first year. The group was originated by Frederick Roemer.

G. princeps is a hybrid between *G. cruentus* and *G. Childsii*, produced by Van Fleet, who gave the history of it as follows (Van Fleet, 1904):

Gladiolus Cruentus has round, widely-opened blooms about two inches across when fully developed, bright blood-red in color, with broad white markings in the throat, particularly at the bases of the lower petals or perianth divisions. It grows two or more feet high, with broad, handsome foliage, with a characteristic droop to the tips

of the leaves. It is usually short-lived under cultivation, thriving best in well-drained peaty soils.

Mrs. Beecher, the pollen parent of *G. Princeps*, I understand, is one of the original *Childsi* varieties grown by the late Herr Max Leichtlin, of Baden Baden, Germany — from seed of *G. Saundersii* pollinated with a superior *Gandavensis* variety. Plants of Mrs. Beecher grow over four feet high with long, straight spikes of widely-opened blooms often five inches across. The color, though disposed very much in the manner of *G. Cruentus*, is rather dull crimson with speckled white throat.

Owing to the similarity of color pattern of the two varieties I made many pollinations in 1895 of *Cruentus* with Mrs. Beecher and seventy-two seedlings resulted, blooming in 1896-7. *Princeps* was the most vigorous and in some respects the most attractive and was so named by Herr Leichtlin, who introduced it to the Botanic Gardens of Europe in succeeding years, on account of its great international value and wide general recognition. I have since made many hundreds of crosses of *Cruentus*, which is a very shy seeder, with the best procurable species and varieties, resulting in some exceedingly handsome hybrids, but have found few worthy to send out as companions of *Princeps*.

The stock of *Princeps* was sold in 1902 to Vaughan's Seed Store for \$1000 — a record price at the time, but since greatly exceeded for the stocks of successful novelties — and introduced by them the succeeding year.

Princeps has probably the most extensive list of high awards from representative horticultural societies ever achieved by a *Gladiolus* variety and is still frequently exhibited and commented on in home and foreign gardening periodicals.

G. propinquus is a hybrid between *G. floribundus* and *G. blandus*, resembling the latter. It was raised by Dean Herbert.

G. pudibundus (Blush-flowered Corn Flag) was figured by Sweet (1832-35), and described by him as follows:

This is a hybrid, we believe, between *Gladiolus cardinalis* and *blandus* and was raised by the Honorable and Reverend William Herbert to whom we are obliged for the specimen figured in the plate.

Stem from two to three feet high, straight, cylindrical, smooth. Leaves broadly ensiform, acuminate, ribbed, of a pale green. Flowers large, of a brilliant rose color, about ten in number, distantly alternate and disposed in a distichous spike. The three lower segments marked with a pale whitish lanceolate spot having a deep red edge. Anthers purple. Filaments and style declinate, white. Stigmas linear-cuneate notched, concave, copiously papillose.

G. ramosissimus is probably a hybrid. It is mentioned in *Gardners' Chronicle*, 1842, page 171, as ranking next to *G. cardinalis* and *G. psittacinus* in beauty. The plant is tall, and bears a profusion of pale rosy pink flowers.

G. ramosus (Branching *Gladiolus*) is a hybrid which originated at Haarlem from seed of *G. blandus* or *G. floribundus*, according to a writer in *Revue Horticole* in 1838. Some persons regarded it as a distinct species from the Cape of Good Hope. These doubtless confused it with the *G. ramosus* of Linnaeus, which has since been referred to the genus *Melasthaerula* Ker. Baker thinks this form is a hybrid between *G. oppositiflorus* and *G. cardinalis*.

The plant is tall, with heavy, broad leaves. The flowers are openly funnel-shaped, bright red, with dark blotches at the base of the three lower segments. The flower has a general resemblance to that of *G. blandus*. This type blossomed later than the varieties of the *blandus* and *cardinalis* groups, and was for a long time an important one in the

garden. The corms should be planted in the fall, since the variety does not flower well if planted in the spring. It is not hardy, and can be brought safely through the winter only by planting in well-drained soil and protecting with a heavy mulch, or by planting in a cold frame.

G. rigidus is a hybrid between *G. tristis* and *G. blandus*, but inclining toward the latter. It was raised by Dean Herbert.

G. schwartzenbergianus is a hybrid with the same ancestry as *G. gandavensis*, and was listed by Jacob Makoy in 1842.

G. splendidus is another hybrid with the same parentage as *G. gandavensis*, offered by Jacob Makoy in 1842.

G. spofforthianus is a hybrid between *G. cardinalis* and *G. blandus*, raised by Dean Herbert. The flowers show more resemblance to *G. blandus* than to *G. cardinalis*. The name was given to honor Spofforth, the home of its originator.

G. Sternii is a hybrid raised by Beddinghaus and introduced by Jacob Makoy in 1842.

G. turicensis is a hybrid between *G. Saundersii* and *G. gandavensis*, offered by M. Froebel, of Zurich, Switzerland, in 1889. This hybrid was cataloged in the United States by Peter Henderson in 1891.

G. Victorialis is a hybrid between *G. byzantinus* and *G. cardinalis*. It originated with Dammann, who offered it in 1893 with the following description:

A new early-flowering class of gladioli standing the winter well. It is the first hybrid gladiolus between a European and a Cape species. The habit of the plant stands between those of its parents. It is dwarf, robust, and rich flowering. The flowers are pink or dark red, and the inner segments are striped like those of the African *Gladiolus cardinalis*. They appear about the middle of April, are large, very open, and somewhat scented. The *Gladiolus Victorialis* offers quite a new field to the grower as he may further try to unite the beauty of the African species and the hardiness of the European kinds. Well adapted for the market and cutting.

G. vitriacensis is a hybrid between one of the *Lemoinei* varieties and some of the early-flowering forms known as *G. nanus*. The flowers are reported as being of medium size and brick red in color, with the characteristic blotches of the dwarf type. The plant, however, is taller and more vigorous than the dwarf type. This form was offered in 1913 by Cayeux et Le Clerc, who have seedlings of other colors ready for introduction. The value of this type is that it fills the gap between the early- and late-flowering groups.

G. Willmoreanus is a hybrid of *G. gandavensis* and *G. floribundus*. The flower is creamy white, with the three upper segments streaked delicate rosy purple. It resembles *G. psittacinus* in form, but not in color. The variety was introduced as *G. natalensis* var. *Willmoreanus*. Allied to this were the following varieties: *G. oldfordiensis* — flowers large, delicate

salmon marked with purple; *G. rosco-purpureus* — flowers of medium size, of a deep rosy red marked with deep purple-red; Wellington — flowers large, deep orange-red. All these were raised by Mr. Cole, gardener to Mr. Willmore, of Oldford, and were noted in the *Floricultural Cabinet* for 1850, page 295.

HISTORY OF GLADIOLUS IN AMERICA

The gladiolus was not an important garden flower in America one hundred years ago, and in comparison with other flowers it received scant treatment in the garden books of the period. McMahon (1806) mentions "gladioluses," or "gladiolus's," incidentally in his brief discussion of the culture of hardy bulbs, and likewise in connection with Cape and greenhouse bulbs. A list of species with the common name of each, taken from English garden works, is given at the end of his book. As will be seen later, these species were not cataloged in this country. Green (1828) does not mention gladioli. Sayers (1838) names the following species:

Tender bulbous plants

<i>Gladiolus versicolor</i>	Variegated.....	May, June
<i>G. cardinalis</i>	Dark red.....	May, July
<i>G. psittacinus</i>	Yellow.....	

Florists' flowers

<i>Gladiolus alatus</i> , bright orange	<i>G. floribunda</i>
<i>G. byzantium</i> , delicate purple	<i>G. fragrans recurvus</i>
<i>G. carneus</i> , flesh-colored	<i>G. hirsutus roseo</i>
<i>G. cardinalis</i> , superb scarlet	<i>G. psittacina</i> (parrot-like)

A few years later the works of Breck (1851), Bridgeman (1847), and others gave more space to the culture of gladioli, but it was not until the time of the Civil War that there seems to have been any considerable interest in the flower.

The most extensive collection of gladioli offered by any of the pioneer American seedsmen was that of William Prince, who in 1825 offered the following species and varieties:

Gladiolus (Corn flag, or sword lily)

Class, *Triandria*; Order, *Monogynia*

1. *Gladiolus communis*, purple
2. *Gladiolus communis*, rose-colored
3. *Gladiolus communis*, large red
4. *Gladiolus communis*, flesh-colored
5. *Gladiolus byzantinus*, or Turkish flag
6. *Gladiolus segetum*
7. *Gladiolus Watsonius*, or scarlet flag
8. *Gladiolus tyger*, yellow
9. *Gladiolus*, large African

Under *Greenhouse Plants* the following are given:

735. Rose-colored gladiolus, *G. africanus roseo*
 736. Yellow gladiolus, *G. africanus luteo*
 737. Narrow-leaved red gladiolus, *G. angustifolia rubro*
 738. Two-spotted gladiolus, *G. bimaculatus*
 739. Sad-flowering gladiolus, *G. triste*

The first species was offered at 12 cents for each bulb, the next three kinds at 20 cents, the fifth kind at 25 cents, the sixth at 50 cents, and all the others at \$1 each.

The oldest American catalog consulted in this work was that of Grant Thorburn for 1824. Here are offered "Gladiolus, or Sword Lily, beautiful," at 12 cents and "Gladiolus by name, superb varieties," at 50 cents each. Thorburn offered in 1827 the following gladioli, the prices of which also are interesting:

		Each	Per dozen
<i>alatus</i> , or wing-flowered.....	Bright orange.....	\$.50	\$5.00
<i>byzantinus</i> , or Turkish flag.....	Delicate purple.....	.25	2.50
<i>carneus</i>	Flesh-colored.....	.50	5.00
<i>cardinalis</i> , or large-flowered.....	Superb scarlet.....	.50	3.00
<i>floribundus</i> , or cluster-flowered.....		.50	5.00
<i>frangans recurvus</i> , or sweet-scented.....		.50	5.00
<i>frimiculata</i>.....		.50	5.00
<i>hirsutis roseo</i> , or rose-colored.....		.50	5.00

The catalog of Thorburn for 1832 includes *psittacina* (parrot-like), a new and splendid variety sold at 75 cents each or \$6 a dozen. *Frimiculata* was dropped. Aside from these two changes the list is similar to the preceding.

Landreth in 1828 cataloged *G. undulatus* and *G. carneus*.

The editor of *American Gardeners' Magazine* stated in 1835 that *G. byzantinus*, *G. cardinalis*, and *G. communis* were the only kinds observed in the gardens around Boston. In the same year S. Sweetser read a paper at the January meeting of the Massachusetts Horticultural Society, entitled *Remarks on the Management of Gladiolus natalensis* (now properly known as *G. psittacinus*). He had flowered the species the year before from bulbs procured from Thorburn, who imported the species in 1832 and offered it to his customers. Later (in 1835) it was stated that *G. Colvillei* and *G. tristis* were flowered by Mr. Cushing. Baron von Ludwig sent a collection of bulbs to the Massachusetts Horticultural Society in 1836, and among them were *G. hirsutus*, *G. blandus*, and *G. alatus*. Marshall P. Wilder flowered and exhibited *G. floribundus* and *G. pudibundus* (a hybrid raised by Dean Herbert) in 1837.

Hovey & Co. in 1839 offered corms of *G. natalensis* at 20 cents each, and of *G. floribundus* at 50 cents each.

R. Buist in 1844-45 cataloged the species *bimaculatus*, *blandus*, *byzantinus*, *cardinalis*, *Colvillei*, *floribundus*, *formosissimus*, *galeatus*, *hirsutus*,

inflatus, *insignis*, *præcor*, *psittacinus*, *pudibundus*, *ramosus*, *roseus*, and *undulatus*, and the variety Queen Victoria. *G. ramosus*, *G. insignis*, and *G. formosissimus* were \$2 each, while Queen Victoria corms were \$2.50 each.

The editor of the *Magazine of Horticulture* says (on page 6 of volume for 1846) that the variety Queen Victoria, and the species *G. gandavensis* and *G. ramosus*, have already flowered in this country. *G. Christianus* was exhibited on July 18 of the same year, and *G. belviderus* on August 1. *G. Wilhelmus* and the variety Lizette were exhibited on June 26, 1847, and *G. Liebnitzii* was exhibited on July 24.

The culture of gladioli, however, was not very common at this time. An amateur florist wrote as follows (Anonymous reference, 1848 a):

The Gladiolus.—This is one of the finest bulbs in the world for the open border in this country. The common Gladiolus, or "sword lily," (*G. communis*,) with purple flowers, and the green striped, or Parrot Gladiolus, (*G. psittacina*,) are well known hardy border flowers. But the finer new hybrid species and varieties, so well known in Belgium, (where they cultivate above forty sorts,) are very seldom seen in the United States, except in the gardens of the largest collectors.

They are well worthy of more attention. The roots of these new sorts are very easily preserved through the winter in a cellar or green-house; and nothing can well be more gay, brilliant, or delicate than the colours of many of the finer sorts,—*G. cardinalis*, *gandavensis*, *roseus*, etc., with all the shades of flesh colour, rose, pink, deep scarlet, and purple, in their long spikes of blossoms. They also come into bloom at midsummer, when there are comparatively few flowers in our borders. Good, rich, sandy loam, and an open exposure, will, in this climate, grow them to our great satisfaction.

Hovey in 1852 listed the following species and varieties under the head *Greenhouse Bulbs*: *blandus*, *cardinalis*, *Colvillei*, *floribundus*, *gandavensis*, Lord John Russell, *natalensis*, Prince Albert, *pudibundus*, Queen Victoria, *ramosus*. In 1854 the following were added: Apollon, Eugénie, Intermedius, *psittacinus major*, *rosea carnea*, Ulysses.

From the foregoing it is evident that many, if not all, of the new kinds appearing in Europe were offered to American growers. That the importations were made is sufficient indication of an interest in gladioli, but up to 1852 the writer has not discovered any record of new varieties being produced in America.

E. S. Rand, jr., as chairman of the floral committee of the Massachusetts Horticultural Society, published with his report for 1858 a paper on the culture of the gladiolus, in which he expressed the hope that seedlings would be raised. It appears later that Mr. Rand and others acted upon the suggestion, for the following statement is found in the history of the above-named society: "This year [1863] witnessed the commencement of those profuse and beautiful displays of *seedling* gladioli." Mr. Rand exhibited in 1863 seedling no. 12, rosy salmon, which was commented upon favorably by the committee. A week later, on September 5, he

exhibited no. 2, white, a fine hybrid between *Sulphuria* and *Berthe Rabourdin*. On September 12 he exhibited seedling no. 13, light salmon in color. John Hogan exhibited five seedlings on August 22, and James McTear nine on August 29 and one on September 12.

W. C. Strong, E. S. Rand, jr., George Craft, Francis Parkman, and James McTear were the principal exhibitors of seedlings in 1864. Craft won the silver and bronze medals. *Elnora* (Craft), the variety awarded the silver medal, was a pure white, in some cases faintly flaked with violet, the center petal feathered maroon on delicate lemon ground; it was characterized by a bold spike, a large flower, a neat and compact face, and vigorous habit. Colonel Wilder Wright (Craft), the variety awarded the bronze medal, was of the reverse-flowered form, carnation in color, marbled and mottled with carmine, the lower petals heavily marked and feathered with carmine-purple; its size, form, and habit were good. McTear exhibited *Jeanie Dean*, which was white marked with crimson-purple; other varieties from the same exhibitor were *Salmonia* and *Exemplar*. Strong was awarded a first class certificate for a variety which was brilliant cherry-carmine in color, shaded violet-purple, the lower divisions of the petals marked with a distinct white line. The report for 1864 would indicate that there must have been a remarkable interest in the production of new varieties, for McTear exhibited twelve, Parkman twenty, Craft thirty-eight, and Strong forty-two seedlings during that season.

James McTear won the silver medal for the best seedling exhibited in 1865. George Craft exhibited, among other seedlings, the varieties *Mrs. Westcott*, *Elnora*, and *Fairy*. W. C. Strong exhibited his new seedling *Parkmanii*.

Silver medals were awarded to George Craft and J. S. Richards in 1867; to J. S. Richards for his seedling *The Bride*, and to Francis Parkman, in 1868; to J. S. Richards in 1869; to J. S. Richards for *Elegantissima* in 1871; to A. McLaren in 1872; and to James Comley in 1874. Bronze medals were awarded to J. S. Richards in 1872, and to W. H. Spooner for *Diamond* in 1878. First class certificates were awarded to Francis Parkman in 1866; to J. S. Richards for the seedling named *Joseph Breck* in 1868; to J. S. Richards for the seedling *M. P. Wilder*, and to George Craft for the seedling *Thomas Sheren*, in 1869; to A. McLaren in 1872; to J. C. F. Hyde in 1875; and to J. W. Clark in 1882.

The development attained by these American growers may be understood by the following extract from the report of the floral committee for 1872: "The gladioli were all that could be expected, and nothing seemed to please the strangers so much. Indeed they were astonished when informed that they were American seedlings. Gentlemen capable

of judging on any flower were delighted to know that such progress had been made in the standard of this popular and useful flower."

The credit for introducing the first American seedling has not been definitely determined, owing to the fact that all available catalog files were incomplete. It is quite certain that some of the producers of the new seedlings that have been named were the first to introduce their novelties. In the fifteenth edition (1868-69) of the catalog of Curtis & Cobb, of Boston, Massachusetts, Craft's Elnora, Finette, Imprimis, Lieutenant Stearns, and Viola, and McTear's Salmonia, are fully described.

The bound catalogs of Washburn & Co. for 1868 contain what is probably the first color plate of any variety of gladiolus published by an American seedsman. The varieties figured are *G. brenchleyensis* and Berthe Roubourdin. The first American variety shown by a color plate, so far as the writer can discover, was Innocence, a variety originated by James Vick and figured in his magazine for February, 1885. The two original varieties of *G. Lemoinei* were shown by means of an excellent color plate in *American Gardening* in 1882.

Although Curtis & Cobb appear to have been the first to catalog named American seedlings, nevertheless attention should be given to the *List of Gladiolus Roots*, No. xv, 1870, of George Craft, of Brookline, Massachusetts, wherein are described Blythe, Freedman, Gordianus, Grenadier, Jores Morthen Jongman, Lisette, Napoleon I, Theophila, Hesba, Yosemite, Finette, Katarina, Lieutenant Stearns, Lucilla, Mariana, Morningside, Petit Bonnet, Rosalind, Sarah P. Pearce, Scrooby, Statuiskii, Una, and Violenta. It is stated that these are Craft's own seedlings. It is more than probable, therefore, that Craft offered his seedlings prior to the time when the same varieties were offered by Curtis & Cobb. In 1871 Craft offered Alphonso, Ariadne, Leyden, Lucio, Mrs. Westcott, Naseby, Thomas Sheren, Valentine, and Virginie as new, with the following in his general list: Adriana, Blonde, Early, Golden Lily, Orlando. No new varieties appear in the lists for 1874 and 1875, which complete the lists consulted. There was a lessened production of seedlings after 1873 until about 1890, and the present interest in gladioli dates from about 1908.

Meanwhile the interest in the French varieties of Souchet was increasing. Barnes & Washburn, Spooner & Co. (later Strong & Spooner), Henry A. Dreer, Eugene A. Baumann, George Such, and C. L. Allen had extensive collections of varieties. The last named, in his catalog of spring bulbs for 1869, stated that he had over two hundred varieties, and in 1871 he announced over three hundred varieties. He was at that time the largest grower of corms. In 1870 he had seven acres, and in 1873 fifteen acres, devoted to growing gladioli. The cut blooms were

shipped to New York in large quantities, occasionally as many as ten thousand spikes being sent in one day.

A number of seedlings were raised at Rochester, New York, and introduced in 1883 by James Vick. These were Brunette, Bryant, Charlotte Cushman, David Copperfield, Dr. Warder, Henry Clay, Holmes, Innocence, Longfellow, Lowell, and Rainbow. This list, with the exception of the last-named variety, was cataloged for several years.

The variety Snow White was raised by J. C. F. Hyde, of Newton, Massachusetts, and exhibited before the Massachusetts Horticultural Society in August, 1879, when it was awarded a first class certificate. In 1881 it was recommended by the floral committee for the prospective prize of \$40 as the best flowering plant. Hallock & Son bought the stock in 1883 and changed the name from Hyde's Seedling — or Hyde's White, as it was locally known — to Snow White, and introduced it in 1890.

Among the American varieties of gladioli produced between 1880 and 1890 were Bayard Taylor, Emma Thursby, E. M. Stanton, General Phil Sheridan, Golden, Isaac Buchanan, Joseph's Coat, Martha Washington, President Lincoln, and Augusta (Hallock).

Meanwhile Luther Burbank had been breeding gladioli, and about 1890, after twelve years of experimenting, he placed on the market a strain the flowers of which had greater substance, and therefore withstood the bright sun and dry atmosphere of California much better, than the older types. This strain had strong, stiff stems which were not so tall as in the usual types, but the flowers were large and had all the usual colors. Among the varieties were California, Cisco, Mariposa, Santa Rosa, Shasta, and Yolo. Later, probably in the following year, Igo, Modesto, Mono, and Pohono were added to the list. The price of California and Santa Rosa was \$2 a corm, but the set of ten varieties was offered at \$8. Unnamed seedlings and seed were offered for sale. The variety California was remarkable from the fact that the flowers were arranged close together all around the stem. The development of a number of similar varieties in France may possibly have started from this singular variety developed by Burbank. The variety California was notable also in another respect, and that was its habit of sometimes producing double flowers. If this tendency appeared when the variety was grown outside of California it does not seem to have impressed lovers of the flower, for nothing resulted from it.

The work of Matthew Crawford began about 1880, but he did not catalog gladioli until 1888. Prior to 1891 he offered his gladioli in mixtures. The first seedlings which he named and introduced were Bertha, Lulu, Mabel, and May, in 1891. In the subsequent years he offered

only mixed gladioli until 1895, when he again offered the varieties named. Unnamed seedlings one and two years old, raised from English-, French-, German-, and American-grown seed, were offered in 1891, and no doubt many of the later introductions of other growers came from this or similar sources. Isabel, Jessie, Margaret, and New America are some of Crawford's more recent varieties.

Then came the introduction of the *Childsii* varieties, remarkable for their vigor of growth and large flowers. These have had an important part in the development of American gladioli and in the increase of the flower in popular favor.

Any account of the development of American gladioli would be incomplete without mention of the work of H. H. Groff, of Simcoe, Ontario. His work was begun prior to 1890, and for years he has been breeding to eliminate the weakness of existing types. Using the strongest parents, and particularly those of individual merit (and he is unexcelled in his knowledge of varieties), he has practiced a rigid selection among his seedlings. The result is that the name Groff's Hybrids, as applied to his own named varieties, has become a synonym of merit. Through cooperation with Arthur Cowee, whose ability as a grower and exhibitor equals that of Mr. Groff as a breeder, these hybrids have become widely and thoroughly known.

The popularity of gladioli as garden flowers is due to Mr. Cowee in larger degree than to any other person. He has labored for many years to bring the merits of the flower to the attention of the people. The splendid exhibits he has made at expositions and fairs, his attractive advertising in magazines and in his catalogs, and more than all his personal enthusiasm, have served to place gladioli in the foremost rank among the garden flowers of the United States. Without the interest of the people many of the present growers would not find a market for their bulbs. All the growers, and garden lovers generally, owe much to the pioneer efforts of the gardeners of Boston, and to Childs, Crawford, Cowee, and Groff.

The ruffled gladioli produced by A. E. Kunderd, of Goshen, Indiana, are a distinctly new and original American type. The flowers are distinguished by the peculiar ruffling or fluting of the petals, producing an artistic effect approaching that seen in waved sweet peas. The first variety introduced was Kunderdi Glory. The ruffled gladioli are the result of experiments begun about 1896, in crossing and selection of plants showing the ruffled tendency.

American growers do not depend on the novelties sent out by foreign firms, for they have produced numerous varieties better suited to this soil and climate. A study of these varieties often reveals the fact that

they are not clearly of any particular type of gladioli, and they are referred to as *American*, by which is meant that they have been produced here and are the result of so much intercrossing of previous forms that they stand alone. As has been done with the carnation, the gladiolus growers are making a new and distinctly American type of plant and flower. Through the breaking of Old World fetters and limitations the way is open to further achievement, for which the future holds bright prospects for American gladiolus breeders.

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COLOR PLATES AND FIGURES

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alatus Linn.

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 Ker, *Curtis's Bot. mag.* 16, tab. 586. 1802.
 Marloth, *Flora South Africa* 4:155, tab. 47. 1915.
 Sweet, *Brit. flow. gard.*, ser. 1, tab. 187. 1827.

alatus var. *namaquensis* Ker

- Andrews, *Bot. repos.*, tab. 122 under title *G. galeatus*.
 Ker, *Curtis's Bot. mag.* 16, tab. 592. 1802.

angustus Linn.

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 Jacquin, *Icones plant. rar.*, tab. 252.
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 Redoute, *Les lilacées*, tab. 344.

blandus Aiton

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blandus var. *albidus* Jacq.

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Gladiolus (*continued*):*blaudus* var. *carneus* De la RocheAndrews, Bot. repos., tab. 188 under title *G. campanulatus*.Ker, Curtis's Bot. mag. **18**, tab. 645. 1803.*blaudus* var. *Mortoni* Herb.Hooker, W. J., Curtis's Bot. mag. **65**, tab. 3680. 1839.*brachyandrus* BakerBaker, Curtis's Bot. mag. **105**, tab. 6463. 1879.*brevifolius* Jacq.Andrews, Bot. repos., tab. 240 under title *G. carneus*.

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carmineus WrightWright, Curtis's Bot. mag. **132**, tab. 8068. 1906.*cochleatus* SweetSweet, Brit. flow. gard., ser. **2**, tab. 140.*communis* Linn.Curtis, Bot. mag. **3**, tab. 86. 1789.Ker, Curtis's Bot. mag. **38**, tab. 1575. 1813.

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cruentus MooreHooker, J. D., Curtis's Bot. mag. **95**, tab. 5810. 1869.

Moore, Florist and pomologist, 1869, p. 121.

cuspidatus Jacq.

Andrews, Bot. repos., tab. 219.

Jacquin, Icones plant. rar., tab. 257.

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Redoute, Les liliacées, tab. 136.

cuspidatus var. *ventricosus* Lam.Andrews, Bot. repos., tab. 147 under title *G. cuspidatus*.Jacquin, Icones plant. rar., tab. 255 under title *G. carneus*.Ker, Curtis's Bot. mag., tab. 591 under title *G. carneus*.Redoute, Les liliacées, tab. 36 under title *G. cuspidatus*.*debilis* KerKer, Curtis's Bot. mag. **52**, tab. 2585. 1825.Marloth, Flora South Africa **4**:155, tab. 47. 1915.*dracocephalus* Hook. f.

Hooker, J. D., Curtis's Bot. mag., tab. 5884.

Eckloni Lehm.Baker, Curtis's Bot. mag. **103**, tab. 6335. 1877.*edulis* Burch. ex KerKer, Bot. reg. **2**, tab. 169. 1817.*florentiae* Marl.Marloth, Flora South Africa **4**:155, tab. 47. 1915.*floribundus* Jacq.Andrews, Bot. repos., tab. 118 under title *G. grandiflorus*.

Jacquin, Icones plant. rar., tab. 254.

Gladiolus (*continued*):*floribundus* Jacq. (*continued*):Ker, Curtis's Bot. mag. **17**, tab. 610. 1802.

La Belgique horticole, 1859, plate 23.

*gandavensis*Paxton, Mag. bot. **11**:27. 1844.Van Houtte, Flore des serres **2**, tab. 1. 1846.Van Houtte, Revue horticole **18**:141-142. 1846.*gandavensis* var. *citrinus* (Lemonier)Van Houtte, Flore des serres **5**, tab. 539. 1849.*gandavensis* var. *superba*Paxton, Mag. bot. **13**:190. 1847.*gracilis* Jacq.

Jacquin, Icones plant. rar., tab. 246.

Ker, Curtis's Bot. mag. **16**, tab. 562. 1802.Marloth, Flora South Africa **4**:153, tab. 46. 1915.

Redoute, Les liliacées, tab. 425.

grandis Thunb.Andrews, Bot. repos., tab. 19 under title *G. versicolor*.Ker, Curtis's Bot. mag., tab. 1042 under title *G. versicolor*.Marloth, Flora South Africa **4**:157, tab. 48. 1915.*hirsutus* Jacq.Andrews, Bot. repos., tab. 11 under title *G. roseus*.Herbier générale de l'amateur **2**, tab. 127 under title *G. hirsutus* var. *roseus*. 1817.

Jacquin, Icones plant. rar., tab. 250.

Ker, Curtis's Bot. mag. **16**, tab. 574 under title *G. hirsutus* var. *roseus*. 1802.

Redoute, Les liliacées, tab. 273.

hyalinus Jacq.Jacquin, Icones plant. rar., tab. 242 under title *G. strictus*.*illyricus* KochBabington, Seemann's Journ. bot. **1**, tab. 4. 1863.Reichenbach, Icones florae germ. et helv. **9**, tab. 352.Schlechtendal, Flora von Deutschland **4**:65, tab. 309. 1880.Sowerby and Smith, English botany **9**, tab. 1493. 1842.*imbricatus* Linn.Reichenbach, Icones florae germ. et helv. **9**, tab. 350.

Reichenbach, Icon. bot. seu plant. crit., tab. 599.

Schlechtendal, Flora von Deutschland **4**:66, tab. 310. 1880.*Kolschyanus* Boiss.Baker, Curtis's Bot. mag. **112**, tab. 6897. 1886.*Ludwigii* var. *calvatus* BakerBaker, Curtis's Bot. mag. **103**, tab. 6291 under title *G. ochroleucus*. 1877.*Mackinderi* Hook.Hooker, J. D., Curtis's Bot. mag. **128**, tab. 7860. 1902.*maculatus* SweetMarloth, Flora South Africa **4**:158, tab. 48. 1915.*Masoniorum* BakerWright, Curtis's Bot. mag. **140**, tab. 8548. 1914.*Melleri* BakerWright, Curtis's Bot. mag. **141**, tab. 8626. 1915.*Milleri* KerKer, Curtis's Bot. mag. **17**, tab. 632. 1803.*montanus* Linn.Loddiges, Bot. cab. **11**, tab. 1022 under title *Antholyza montana*. 1825.*niveni* BakerAndrews, Bot. repos., tab. 275 under title *G. ringens* var. *undulatus*.*oppositiflorus* Herb.Baker, Curtis's Bot. mag. **119**, tab. 7929. 1893.Watson (?), Garden **45**:440-441. 1894.*orchidiflorus* Andr.

Andrews, Bot. repos., tab. 241.

Jacquin, Icones plant. rar. tab. 259 under title *G. alatus*.Ker, Curtis's Bot. mag. **18**, tab. 688 under title *G. viperatus*. 1803.Sweet, Brit. flow. gard., ser. 1, tab. 156 under title *G. viperatus*. 1826-27.

*Gladiolus (continued):**palustris* Gaud.

Reichenbach, Icones florae germ. et helv. 9, tab. 351.

Schlechtendal, Flora von Deutschland 4:62, tab. 307. 1880.

papilio Hook.

Hooker, J. D., Curtis's Bot. mag. 92, tab. 5565. 1866.

psittacinus Hook.

Hooker, W. J., Curtis's Bot. mag. 57, tab. 3032. 1839.

Lindley, Bot. reg. 17, tab. 1442. 1831.

Loddiges, Bot. cab., tab. 1756 under title *G. natalensis*.

Reichenbach, Exot., tab. 116.

Sweet, Brit. flow. gard., ser. 2, tab. 281. 1835.

psittacinus var. *Cooperi* Baker

Baker, Curtis's Bot. mag. 101, tab. 6202. 1875.

purpureo-auratus Hook. f.

Hooker, J. D., Curtis's Bot. mag. 98, tab. 5944. 1872.

Van Houtte, Flore des serres 19, tab. 1992. 1873.

Quartinianus A. Rich.

Baker, Curtis's Bot. mag. 110, tab. 6739. 1884.

recurvus Linn.

Andrews, Bot. repos., tabs. 27 and 227 under title *G. ringens*.

Jacquin, Icones plant. rar., tab. 247 under title *G. punctatus*.

Ker, Curtis's Bot. mag. 16, tab. 578. 1802.

La Belgique horticole, 1859, plate 23 under title *G. ringens* Andr.

Marloth, Flora South Africa 4:156, tab. 47. 1915.

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Van Houtte, Flore des serres 4, tab. 422. 1848.

Saundersii Hook. f.

Hooker, J. D., Curtis's Bot. mag. 96, tab. 5873. 1870.

Saunders, Garden 12:64. 1877.

segetum Ker

Hallier, Deutschlands Flora, tab. 386. 1873-75.

Ker, Curtis's Bot. mag. 19, tab. 719. 1804.

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Reichenbach, Icon. bot. seu plant. crit., tab. 600.

Schlechtendal, Flora von Deutschland 4:67, tab. 353. 1880.

sericeo-villosus Hook.

Hooker, W. J., Curtis's Bot. mag. 90, tab. 5427. 1864.

spathaceus Pappe

Marloth, Flora South Africa 4:158, tab. 48. 1915.

striatus Jacq.

Jacquin, Icones plant. rar., tab. 260.

sulphureus De Graaf

Hooker, J. D., Curtis's Bot. mag. 127, tab. 7791. 1901.

Molkenboer, Jaarboek Tuinbouw, 1850, p. 39.

tenellus Jacq.

Jacquin, Icones plant. rar., tab. 248.

Marloth, Flora South Africa 4:157, tab. 48. 1915.

trichonemifolius Ker

Ker, Curtis's Bot. mag. 36, tab. 1483. 1812.

tristis Linn.

Curtis, Bot. mag. 8, tab. 272. 1794.

Ehret and Trew, Plantae selectae, 1750-1773, tab. 39 under title *G. bifolius et biflorus, folius quadrangularis*.

Jacquin, Icones plant. rar., tab. 243.

Ker, Curtis's Bot. mag., tab. 1098.

Redoute, Les liliacées, tab. 35 under title *G. spiralis*.

tristis var. *concolor* Salisb.

Jacquin, Icones plant. rar., tab. 245 under title *G. tristis*,

Marloth, Flora South Africa 4, tab. 46. 1915.

Salisbury, Paradisus Londinensis, tab. 8.

Gladiolus (*continued*):*undulatus* Jacq.Jacquin, *Icones plant. rar.*, tab. 251.Ker, *Curtis's Bot. mag.* 18, tab. 647. 1803.Redoute, *Les liliacées*, tab. 122.*villosus* KerKer, *Curtis's Bot. mag.* 21, tab. 823 under title *G. hirsutus* var. 1805.*vittatus* Hornem.Ker, *Curtis's Bot. mag.* 15, tab. 538 under title *G. undulatus*. 1801.Schneevoogt, *Icones plant. rar.*, tab. 19 under title *G. angustus*.*vomerculus* KerKer, *Curtis's Bot. mag.* 38, tab. 1564 under title *G. hastatus*. 1813.

HYBRID GLADIOLI

Gladiolus:

antwerpiensis

Flor. cab. 10:265. 1842.

christianus

Revue hort. 23:341. 1851.

*colvillei*Maund, *Bot. gard.* 5:4, tab. 167, fig. 5.Mrs. Loudon, *Ladies' flow. gard.*, Bulbs. tab. 13, fig. 5, p. 61. 1841.Sweet, *Brit. flow. gard.*, ser. 1, tab. 155. 1826-27.Van Houtte, *Flore des serres* 19, tab. 1993. 1873.*colvillei albus*Pucci, *Bul. Roy. Soc. Toscana Ort.* 23, tab. 7. 1898.Van Houtte, *Flore des serres* 19, tab. 1993.*delbarinus* (Delbaere)

Ann. Soc. Roy. Hort. Gand 3, tab. 158. 1847.

hybridus Lemoine

Amer. gard. n. s. (1:5). 1882.

Garden 17:306. 1880.

*ignescens*Maund, *Bot. gard.* 6:136, tab. 233, fig. 2.*insignis*Paxton, *Mag. bot.* 7:223. 1840.*lemoinei*

Amer. gard. n. s. 1:5. 1882.

Revue hort. 51:330. 1879.

leopoldii (Carolus)

Ann. Soc. Roy. Hort. Gand 4, tab. 194. 1848.

*mitchamiensis*Herbert, *Trans. Hort. Soc. London* 4, tab. 2 under title *G. tristi-hirsutus*.*oldfordiensis* (Cole)Moore, *Gard. mag. bot., hort., and flor.*, 1850, p. 249.*picta blandas* (Plant)

Flor. cab. 6:264. 1838.

primulinus hybrids

Garden 76:391. 1912.

Garnier, *Revue hort.* 82:578-579. 1910.*princeps* (Van Fleet)

Revue hort. 76:208-209. 1904.

pudibundus (Herbert)Paxton, *Mag. bot.* 2:197. 1836.Sweet, *Brit. flow. gard.*, ser. 2, tab. 176. 1833.*quartinianus superbus*

Garden 55:388-389. 1899.

ramosus

Flor. cab. 7:143. 1839.

Maund, *Bot. gard.* 6:165, tab. 238, fig. 2.Mrs. Loudon, *Ladies' flow. gard.*, Bulbs. tab. 12, fig. 1.Paxton, *Mag. bot.* 6:99. 1839.

Gladiolus (*continued*):*rigidus* (Herbert)Herbert, Trans. Hort. Soc. London 4, tab. 2 under title *G. tristi-blandus*.*ringente-tristis* (Herbert)

Herbert, Trans. Hort. Soc. London 4, tab. 2.

roseo-purpureus

Flor. cab. 19:6. 1851.

Moore, Gard. mag. bot., hort., and flor., 1850, p. 249.

Willmoreanus (Cole)

Moore, Gard. mag. bot., hort., and flor., 1850, p. 169.

Van Houtte, Flore des serres 6, tab. 639.

HORTICULTURAL VARIETIES

Ad. Brongniart (Souchet)

Floral mag. 6, tab. 363. 1867.

Aida (Haage & Schmidt)

Deut. Mag. Gart. u. Samenkunde, 1878, p. 371

Alice Wilson (Standish)

Flor. and pomol., 1873, p. 73.

Alphonse Lavalley

L'hort. franç., 1856, tab. 20.

Alsace

Revue hort. Belge 13:227, tab. 23. 1887.

Alsace-Lorraine (Lemoine), *nanceinaus* var.

Jardin, 1902, p. 216.

Prakt. Ratgeber Obst u. Gartenbau 19:360. 1904.

Aristote

Illus. hort. 4, tab. 154, fig. 4. 1857.

Arlequin (Souchet)

Flore des serres 12, tab. 1246. 1857.

Illus. hort. 4, tab. 154, fig. 8. 1857.

Atroroseus

Florists' journ. 3:177. 1842.

Bala (Kelway 1911)

Garden 76:437. 1912.

Baron Joseph Hulot (Lemoine 1896), *Lemoinei* var.

Revue hort. 71:404. 1899.

Beatrice

Garden 17:156. 1880.

Ben Hur (Childs), *Childsii* var.

Garden 48:420. 1895.

Bernard de Rennes (Truffaut)

Revue hort. 23:341.

Berthe Rabourdin

Flor. fruit and gard. misc., 1859, p. 97.

Illus. hort. 4, tab. 154, fig. 5. 1857.

Blushing Bride

Garden 34:580. 1888.

Revue hort. 71:111, fig. 4. 1899.

Boussingault (Lemoine 1887)

Revue hort. 50:228. 1888.

Bramfarine (E. Aragon)

Revue hort. 39:131-132. 1867.

Calypso

Illus. hort. 6, 227, fig. 5. 1859.

Illus. Gart. Ztg., 1860, p. 128.

Canari

Illus. hort. 6, tab. 227, fig. 1. 1859.

Illus. Gart. Ztg., 1860, p. 128.

Charles Davis (Standish)

Flor. mag. 3, tab. 171. 1863.

- Charles McIntosh
 Revue hort. 71:111, fig. 5. 1899.
- Christophe Longueil (Dr. d'Avoine)
 Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
- Cochenille (Verdier père)
 L'hort. franç., 1851, tab. 23.
- Comte de Kerchove (Lemoine 1896), *Lemoinei* var.
 Revue hort. Belge 23:217.
- Countess Coghen
 Ann. Soc. Roy. Hort. Gand 3:51. 1847.
- Countess Craven (Kelway)
 Flor. mag. 20:465-466. 1881.
- Couranti carneus (Thibaut et Keteleer)
 L'hort. franç., 1852, tab. 15-16.
- Crepuscul (Lemoine 1899)
 Prakt. Ratgeber Obst u. Gartenbau 19:360. 1904.
- Dame Blanche (Haage & Schmidt)
 Revue hort. 68:540. 1896.
- Demi-deuil (Lemoine 1899), *Lemoinei* var.
 Jardin, 1902, p. 216.
- Diane
 Illus. hort. 6, tab. 227, fig. 8. 1859.
 Illus. Gart. Ztg., 1860, p. 128.
- Docteur Spae (Truffaut)
 L'hort. franç., 1851, tab. 19, fig. 2.
- Duc de Malakoff
 Illus. hort. 6, tab. 227, fig. 3. 1859.
 Illus. Gart. Ztg., 1860, p. 128.
- Ed. Pynaert-Van Geert (Lemoine)
 Revue hort. Belge 18, tab. 19-20, fig. 5. 1892.
- Eleanor Norman
 Flor. mag. 4, tab. 222. 1864.
- Elvira
 Revue hort. 71:111, fig. 7. 1899.
- Emile Galle (Lemoine 1887)
 Revue hort. 63:568. 1891.
- Emperor Napoleon [=Marechal Vaillant] (Leveau, Loise 1866)
 Revue hort. 38:8-9, fig. 2. 1866.
- Ethiope (Lemoine 1898), *Lemoinei* var.
 Revue hort. 71:404. 1899.
- Eugénie Bourdier (Truffaut)
 Flore des serres 7, tab. 697, fig. 1. 1851-52.
- E. V. Hallock (Lemoine), *Lemoinei* var.
 Illus. hort. 37:107, tab. 115, fig. 3. 1890.
- Ferdinand de Lesseps (Lemoine)
 Revue hort. 63:568. 1891.
- Ferdinand Kegeljan (Lemoine), *nanceianus* var.
 Jardin, 1900, p. 348.
- Fille de l'Air (Lemoine 1897), *nanceianus* var.
 Revue hort. 71:404. 1899.
- Flaming Sword (Kelway 1911)
 Garden 76:182, tab. 1449. 1912.
 Garden 76:437.
- Francis Herincq
 L'hort. franç., 1853, tab. 20.
- Gen. Changarnier (Truffaut)
 Flore des serres 7, tab. 697, fig. 3. 1851-52.
- General Grant
 Revue hort. 71:111, fig. 6. 1899.
- General Scott
 Garden 34:580, fig. 3. 1888.
- Georges Frick (Lemoine), *nanceianus* var.
 Jardin, 1900, p. 348.

- Georges van Rye (Dr. d'Avoine)
Ann. Soc. Roy. Hort. Gand, 1849, tab. 239.
- Goethe (Haage & Schmidt)
Deut. Mag. Gart. u. Samenkunde, 1878, p. 371-378.
- Goliath (Souchet)
Illus. hort. **4**, tab. 154, fig. 1. 1857.
- Harry Veitch (Lemoine 1890), *nanceianus* var.
Garden **41**:190. 1892.
- Henri Vautier (Lemoine 1898), *nanceianus* var.
Revue hort. **71**:404. 1899.
- Henry Irving
Revue hort. **71**:111, fig. 2. 1899.
- Horace (Souchet 1869)
Flor. mag. **9**, tab. 507-508. 1870.
- Imperatrice Eugénie (Souchet)
Illus. hort. **14**, tab. 504, fig. 1. 1867.
- Innocence (Vick 1883)
Vick's mag., Feb. 1885.
- Iris (Ragot)
Revue hort. **85**:35. 1913.
- Isoline
Illus. hort. **6**, tab. 227, fig. 2. 1859.
Illus. Gart. Ztg., 1860, p. 128.
- Jacob (E. Aragon)
Revue hort. **39**:131. 1867.
- James William Kelway (Kelway 1911)
Garden **76**:437. 1912.
- Jean Ragot (Ragot)
Revue hort. **85**:35. 1913.
- John Laing (Lemoine)
Illus. hort. **37**:107, tab. 115. 1890.
- John Standish (Douglas)
Flor. and pomol., 1872, p. 169.
- John Standish (Standish)
Deut. Mag. Gart. u. Samenkunde, 1863, p. 353.
Flor. fruit and gard. misc., 1860, p. 231.
Flor. mag. **1**, tab. 36. 1861.
- John Waterer (Souchet)
Illus. hort. **14**, tab. 504, fig. 3. 1867.
- Julia (Kelway)
Flor. mag. **7**, tab. 405. 1868.
- Jupiter (Souchet 1871)
Flor. mag. n. s. **11**, tab. 43. 1872.
- King of Gladioli (Kelway 1905)
Garden **70**:6. 1906.
- Kleber (Lemoine 1890)
Garden **41**:190. 1892.
Revue hort. Belge **18**:217, tab. 19-20, fig. 1. 1892.
- Konigen Wilhelmina
Gartenflora **46**, tab. 1437.
- Lady Alice Hill (Standish)
Flor. and pomol., 1868, p. 241.
- Lady Muriel Digby (Kelway 1904)
Garden **76**:182, tab. 1449. 1912.
- La France (Lemoine)
Garden **30**:76. 1886.
- L'Alsace (Lemoine)
Garden **30**:76. 1886.
- Le Chamois (Souchet)
Flore des serres **12**, tab. 1246. 1857.
- Le Grand Carnot (Lemoine 1890), *nanceianus* var.
Revue hort. Belge **18**:217, tab. 19-20, fig. 6. 1892.

- Leopoldii
Am. Soc. Roy. Hort. Gand 4:173. 1848.
- Le Pactole
Revue hort. 63:568. 1891.
- Louis Van Houtte (Truffaut)
Revue hort. 60:228. 1888.
- Madame Chauviere (Truffaut)
L'hort. franç., 1851, tab. 19, fig. 1.
- Madame de Vilain
Ann. Soc. Roy. Hort. Gand 3:51. 1847.
- Madame Dombrain (Souchet 1868)
Flor. mag. 8, tabs. 463-464. 1869.
- Madame Eugène Verdier
L'hort. franç., 1856, tab. 20.
- Madame Ferdinand Cayeux (Lemoine 1900), *Lemoinei* var.
Jardin, 1902, p. 216.
- Madame Furtado (Souchet)
Flore des serres 7, tab. 697, fig. 4. 1851-52.
- Madame Herincq (Verdier père)
L'hort. franç., 1851, tab. 23.
- Madame Lemichez (Truffaut)
Flore des serres 7, tab. 697, fig. 5. 1851-52.
- Madame Leseble (Souchet)
Deut. Mag. Gart. u. Samenkunde, 1863, p. 353.
Flor. mag. 1, tab. 36. 1861.
- Madame le Vicomtesse Vilain
Ann. Soc. Roy. Hort. Gand 3:51. 1847.
- Madame Pele (Souchet)
Flore des serres 12, tab. 1246. 1857.
- Madame Rivère
L'hort. franç., 1853, tab. 20.
- Madame Rougier
L'hort. franç., 1853, tab. 20.
- Madame Vilmorin (Souchet)
L'hort. franç., 1864, tab. 23.
- Mademoiselle Olympe Lescuyer
L'hort. franç., 1856, tab. 20.
- Mademoiselle Sosthenie (Truffaut)
Revue hort. 25:41. 1853.
- Marechal Fabert (Lemoine 1899)
Jardin, 1900, p. 348.
- Marie Lemoine (Lemoine), *Lemoinei* var.
Amer. gard. n. s. 1:5. 1882.
Garden 17:306. 1880.
Revue hort. 51:330. 1879.
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